



SOVIET MACHINE GUNS OF WORLD WAR II

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CONTENTS

INTRODUCTION

DEVELOPMENT

Tokarev, Degtyaryov and Goryunov

USE

Tactical fire support in total war

IMPACT

The transformation of Soviet firepower

CONCLUSION

FURTHER READING

INTRODUCTION

In 1871, Colonel Aleksandr Pavlovich Gorloff, the military attaché assigned to the Russian Embassy in Washington, DC, was on a mission. The military authorities of Tsarist Russia had received energizing news about the American Gatling Gun, invented by one Dr Richard Gatling. This manually operated multi-barrel weapon could fire at rates in excess of 200rd/min (far higher in some other calibres), roughly equivalent to what 13 infantrymen could achieve with their rifles. Gorloff was promptly dispatched to find out more. He was impressed by what he saw, and ordered 400 Gatlings. The receivers of these weapons were stamped with the word ‘Gorloff’ in Cyrillic, thus they became known in Russia as ‘Gorloffs’, rather than Gatlings.



An SMG-equipped Red Army infantry squad gathers around its core support weapon, a DP machine gun. The effective range of Soviet submachine guns would be about 250m, whereas the DP could command ranges up to 800m. (Courtesy of the Central Museum of the Armed Forces, Moscow via Stavka)

The Gorloffs were the beginning of Russia's adoption and development of machine guns. At first, they were treated somewhat akin to inferior artillery pieces (the primary Russian buyer of the weapons was the Imperial Russian Army's Artillery Administration), and most were emplaced in fortresses. However, they also came to prove their worth in action, their first combat outing being in the Russo-Turkish War (1877–78) and possibly their last at

the siege of Port Arthur during the Russo-Japanese War (1904–05). By this time, the world of small-arms development had taken further big strides, not least with Hiram Stevens Maxim's invention of the belt-fed, recoil-operated machine gun in 1883 – the first true machine gun – the firing cycle of which was driven by its own power rather than an arm-aching hand crank. The Artillery Administration began to acquire Maxims in the final years of the 19th century (having rejected the French Hotchkiss), with Russian production beginning at the Tula Arsenal in 1905. Russia would also purchase British Vickers Guns and made its first moves to acquire light machine guns (LMGs) for squad/section-level support, in the form of Danish Madsen guns.

The progressive adoption and combat testing of the machine gun began to change the face of Russian infantry, cavalry and positional warfare. In the early 1900s, the Imperial Russian Army created experimental machine-gun companies, each armed with eight Maxims. Combat use of the Maxim in the Russo-Japanese War was brutally eye-opening in terms of the potential of these new weapons. At the battle of Shokozan Hill in August 1904, 540 Japanese troops were killed by just a handful of Russian Maxims, and in some actions around Port Arthur half of Japanese casualties were inflicted by Maxims. The lesson was taken forward, then dreadfully amplified in World War I, a conflict dominated by the industrialization of warfare and audibly defined by the incessant rattle of machine guns.

In terms of front-line machine guns, the Imperial Russian Army and post-Revolution Red Army fought World War I largely with the PM M1910 (*Pulemyot Maxima*; 'Maxim's machine gun') – the indigenous version of the Maxim – plus some Vickers and early Colt gas-operated guns; but until the 1920s and 1930s, the first decades of the new Soviet Union, Russian machine-gun technology was largely derivative in nature, looking to foreign purchases and international inspiration to give the ranks automatic support fire. That impulse to look abroad never disappeared entirely during the new economic and military imperatives of the Soviet regime. Western ordnance authorities noted that the Soviets were intensely protective of their own intellectual property, sharing almost no valuable information directly with foreign agencies even when those agencies were their allies in war. During World War II, however, the Soviets were conversely never shy in requesting, with overbearing moral pressure, that Western powers share the details of their own inventions and innovations in firearms technology, arguing that as the Soviet Union was bearing the brunt of the land war against Germany, it

was in the Allies' interests to share insights as a contribution towards final victory.



A Russian M1910 in use with the Finnish Red Guards during the battle of Helsinki in April 1918. Note the large artillery wheels, reflecting the fact that machine guns were often seen as diminutive artillery pieces in the early years of their development. (Finna.fi/Museovirasto Musketti/**CC BY-SA 4.0**)



This evocative photograph shows a typical Red Army machine-gun squad of the late 1920s and early 1930s, with a PM M1910 as the centrepiece. Note the small viewing window in the upper part of the gun shield and also how the assistant machine-gunner has utilized the

ammunition tin lid to guide the cartridges smoothly into the feed. (Copper Kettle/Wikimedia/**CC BY-SA 2.0**)

Yet alongside the foreign influences, the Soviets' own firearms designers and developers also produced an impressive suite of LMGs, medium machine guns (MMGs) and heavy machine guns (HMGs), weapons exhibiting notable reliability, power and combat utility. This effort was partly driven by ambitious communist economic and industrial plans, to which we can add Joseph Vissarionovich Stalin's trickle-down pressure (he took a distinct and often skewed interest in military technology), plus the fact that from 1922 until 1939 the Soviet Union largely enjoyed peacetime conditions that were ideal for creative minds to thrive and work. The weapons that were designed, developed and produced during this time would form the bedrock of Soviet automatic firepower during World War II – a true fight for survival – and are the subject matter of this book.

The focus of this work will principally be on those machine guns utilized in ground warfare and anti-aircraft defence; we will give little space to machine guns fitted to aircraft, with some isolated exceptions for technical illumination. We will restrict our coverage to machine guns below 20mm in calibre, as weapons of that calibre and above belong more properly to the 'cannon' category. The principal weapons we will study here are: the Maxim-type guns, especially the PM M1910 and PM M1910/30; the Degtyaryov family of machine guns, specifically the DP and DPM LMGs, the DT and DTM tank machine guns, the DS-39 MMG, and the DShK and DShKM HMGs; and the Goryunov SG-43 MMG, while also noting a host of other machine guns that demonstrated innovation but which struggled to make it beyond the factory floor, at least in significant volumes.

DEVELOPMENT

Tokarev, Degtyaryov and Goryunov

For the Imperial Russian Army, and the Red Army that succeeded it in the Soviet era, World War I showed just how effective machine guns could be when integrated into the emerging tactics of modern industrial warfare, whether for static defence, support fire or mobile assault. The problem was a matter of supply. Although the Imperial Russian Army had the PM M1910 as its primary MMG, insufficient numbers of home-produced weapons meant that it had to rely upon foreign supplies, notably Colt-produced Vickers guns (chambered for the Russian 7.62×54mmR rifle cartridge) and the Marlin-Rockwell M1917/M1918, the latter essentially an improved Colt-Browning M1895 gas-operated machine gun.



The Lewis gun, widely issued in the British and other armies during and after World War I, was also produced for the Imperial Russian Army – in 7.62mm calibre – by the Birmingham Small Arms (BSA) Company Limited in England. (© Royal Armouries PR.7076)

While there had been some innovation in the closing years of the Tsarist regime – notably Vladimir Grigorevich Fedorov's *Avtomat* – the fledgling Red Army was armed with weapons it had inherited from the Imperial Russian Army. In 1921, the Soviet authorities established an armament design bureau at the Kovrov Machine Gun Factory in Vladimir Oblast, east of Moscow. Interestingly, this factory had been built for the Russians by the Danish Madsen company, in the pre-Revolution days. Now it became a hub of Soviet machine-gun development, and two of its leading figures in the 1920s and 1930s were Fedorov, who was chief of the agency, and his

capable assistant chief, Vasily Alekseyevich Degtyaryov. The two men had worked together at the Sestorets Small Arms Plant and at the Ordnance Proving Ground at Oranienbaum. Regarding Kovrov, armaments historian George Chinn noted its importance: ‘At its inception, the Design Office had several skilled machinists and eight machine tools. This was the real beginning of the automatic-weapon industry in the U.S.S.R. Small as it was, this office was the forerunner of the Fourteenth, Fifteenth, and Sixteenth Bureaus of the Ministry of Armaments, which supervised the design and production of at least a million machine guns in World War II’ (Chinn 1952: 8). Certainly, Fedorov and Degtyaryov displayed considerable freewheeling inventiveness as a partnership. Following the *Avtomat*, they produced experimental models combining the *Avtomat* with components from the Lewis gun and Maxim (the *Avtomat* married with a Maxim water jacket looks supremely awkward).

THE FEDOROV AVTOMAT

From 1906, the great Russian firearms designer Vladimir Grigorevich Fedorov, while working within the weapons department of the Artillery Committee of the Chief Artillery Directorate, began developing automatic rifles, inspired to do so by his experience of automatic firepower in the Russo-Japanese War (1904–05). His first example, a recoil-operated *Avtomat* (machine rifle) chambered in a proprietary 6.5mm cartridge, feeding from a fixed box magazine, underwent trials in 1913. Some 150 examples of Fedorov’s *Avtomat* were produced for evaluation, but the outbreak of World War I saw production of this expensive and, to some, bewilderingly revolutionary weapon cease in favour of cheap standard rifles. Wartime experience, however, highlighted the utility of LMGs, and in 1916 Fedorov began sanctioned development of his *Avtomat* once again. He drew some inspiration from the French Chauchat, a lamentable weapon in itself but with some principles Fedorov could apply. He changed the Chauchat’s fixed magazine to a 25-round detachable box magazine and also altered the ammunition, from a bespoke 6.5mm cartridge to the 6.5×50mm Arisaka, a Japanese cartridge that was supplied to Russia via the British. The *Avtomat* had a short-recoil mechanism in which the barrel assembly and bolt assembly were locked together by two side plates, which were cammed down after a short distance under recoil to allow the bolt assembly to go through the full recoil cycle. It was a selective-fire weapon – a selector switch located just above the trigger guard allowed selection of semi-auto or full-auto fire, the latter at a cyclical rate of 350–400rd/min – and it had a front pistol grip, to give

the user greater control over ‘muzzle climb’ when firing in full-auto mode. A manual bolt hold-open device was added so that the user could reload or top up the magazine via stripper clips.

The *Avtomat* was both ground-breaking and somewhat awkward to place on the spectrum of firearms. In 1917, 5,000 were ordered, but the exigencies of war productions meant that only a fraction of this total was produced, these weapons being issued to better-trained specialist riflemen. Yet in 1921, by which time Fedorov was head of a new automatic-weapons design bureau in Kovrov, the *Avtomat* went back into minor mass production as the Soviet authorities looked to introduce more advanced weapons into their arsenal. By October 1925, 3,200 of the new production model (improved in response to field reports of its unreliability) had been produced. The *Avtomat* saw service in the Russian Civil War (1917–22), but by 1928 was no longer in use, as spare parts and training issues restricted its wider adoption. It made a brief reappearance, however, in the Winter War (1939–40) between the Soviet Union and Finland. Although the weapon seldom appears in photographs outside that specific conflict, the fact that it still gave service in World War II gives a useful indication of its significance.

The *Avtomat*’s inclusion in this book might seem a digression, as to many modern eyes it was an assault rifle – indeed, many internet sources argue that it was the world’s *first* assault rifle – but the assault-rifle claim is quickly debunked by the fact that the weapon fired a full-power rifle cartridge. Thus despite its lack of bipod (it was intended for shooting from the shoulder or hip, or with its forend stabilized on a rest), the *Avtomat* is rather a particularly lightweight (4.4kg unloaded) LMG. That it was intended to be so by the Russians and Soviets is clear from a 1923 manual for the weapon (Sverchkov 1923). This states that the weapon was essentially crew-served, with a gunner and one or two assistant gunners. It also explains the tactical remit of the weapon (Paragraph 100), not principally for firing at point targets but rather engaging whole concentrations of troops and playing across the front of enemy positions. Although from a modern perspective these tactical foci seem a bit ambitious for a 25-round box-fed weapon, at the time the military world was still adjusting to the culture shock of full-auto fire, so it is reasonably clear that the *Avtomat* was envisaged as more than just an automatic rifle.



Vladimir Grigorevich Fedorov’s *Avtomat* was a unique concept for its time, that of the ‘machine rifle’, although ultimately only 3,200 of the weapons were produced. Note the

strange position of the front grip, crowding in on the magazine release. It was likely that the machine-gunner would only wrap his fingers around the front of the grip, to maintain rearward pressure. (HMAAG/Wikimedia/[CC BY-SA 4.0](#))



The Soviet firearms industry was just as inventive in terms of aircraft machine guns as ground types. The weapon here is a 12.7×108mm Berezin UBI, which had a cyclical rate of fire of 800–1,105rd/min. (From the fonds of the RGAKFD in Krasnogorsk via Stavka)

Two other key figures involved in pre-World War II Soviet machine-gun design were Boris Gavriilovich Shpitalny and Irinarkh Andreevich Komaritsky. Shpitalny resided within the pantheon of Soviet arms development, revered by the military establishment. As chief of the OKB 15 (*Opytnoye Konstruktorskoye Buro*; Special Construction Bureau) in the Ministry of Armaments, he worked with Komaritsky to design a new fast-firing aircraft machine gun, the 7.62×54mmR ShKAS (*Shpitalny-Komaritsky Aviatsionny Skorostrelny*; ‘Shpitalny-Komaritsky rapid fire for aircraft’), which employed an ingenious revolving feed mechanism. For this Shpitalny was awarded the Stalin Prize First Class, but did little thereafter. Another significant figure was Mikhail Evgenievich Berezin, who in 1937 began developing a 12.7×108mm gas-operated, air-cooled aircraft machine gun,

which eventually emerged as the BS (*Berezin Sinkhronniy*; Berezin Synchronized) production model in 1938 and several other respected variants during the wartime years. Yet as World War II began in September 1939, it was the venerable Maxim derivatives and the new models from Degtyaryov that would be the core of the Soviet military's automatic firepower on the ground.



This M1905 was given to Britain's Royal Armouries by the Finnish Sotamuseo (Military Museum) in 1980. It is set on an early Sokolov mount raised into its tripod position. Note the extensive use of brass parts, which added to cost and weight. (© Royal Armouries PR.114)

MAXIM-TYPE MACHINE GUNS IN SOVIET SERVICE

Maxim-type machine guns were the most mass-produced and prolific Soviet machine guns of World War II. In 1944 alone, 270,000 Maxims were produced – the next highest-ranking weapon on the chart for 1944 was the Degtyaryov DP, at 120,000 units.

The M1905, M1910 and M1910/30

The first Russian-manufactured Maxim was the M1905, a direct copy of the Maxim 'New Light Model' produced by Vickers, Sons & Maxim from 1906.

Visually distinguishable by virtue of its bronze water jacket (both grooved and smooth versions), the M1905 was ponderous to move and expensive to manufacture, and was mounted on a large-wheeled carriage more akin to that used for light artillery. It was succeeded, however, by the PM M1910. By using lighter materials (the bronze water jacket was replaced by a simple steel version), the M1910's weight compared to that of the M1905 was considerably reduced; the M1905 weighed 35.5kg with its water jacket filled, whereas the M1910 weighed only 24.5kg. The new machine gun also introduced a muzzle brake and an improved locking mechanism. Yet in mass production the differences between the M1905 and the M1910 could be blurred, and corners cut.



This M1910 was also donated by the Finns to the Royal Armouries. It has the simplified Sokolov mount. (© Royal Armouries PR.128)

A crucial feature introduced on the M1910 was a new wheeled mount, designed by Aleksandr Alekseevich Sokolov, which ran on two small wheels

and had a U-shaped drawbar, plus extra legs which enabled it to be converted to anti-aircraft use. These legs were later removed, and instead a single vertical bar was used to elevate the M1910 up to air-defence height. Although heavy and complicated, the Sokolov mount was also robust and functional, and would serve for many decades. In 1915, however, Ivan Nikolaevich Kolesnikov introduced a simpler, lighter mount. Both the Sokolov and Kolesnikov mounts were, in turn, superseded (although not replaced) in 1931 by Semyon Vladimirovich Vladimirov's 'Universal' wheeled tripod mount, with three tubular legs that could be configured for either ground use or, with the wheels removed, air-defence use. (Mounts are discussed in more detail in the 'Use' chapter below.)



A PM 1910/30 gunner prepares to deliver covering fire along a road as Red Army infantry advance. The large-aperture water-jacket filler cap is of the type introduced after Soviet experience in the Winter War against the Finns in 1939–40. (From the fonds of the RGAKFD in Krasnogorsk via Stavka)

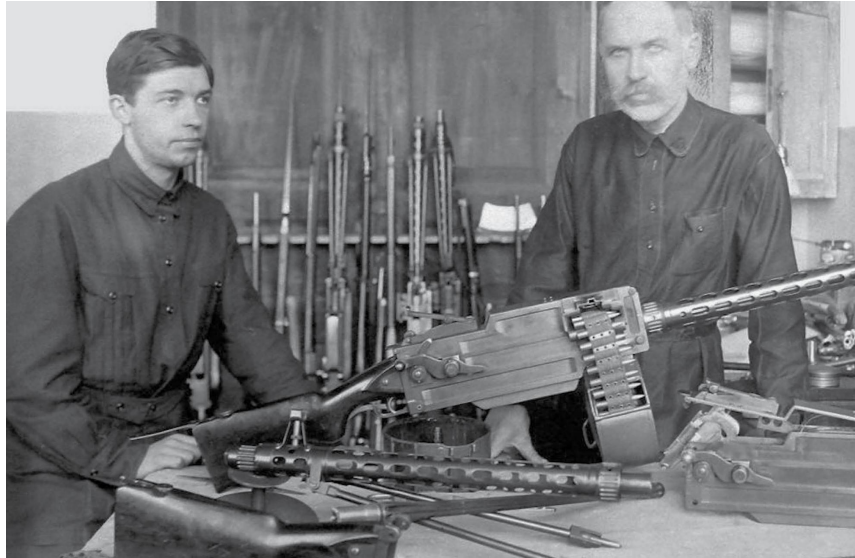
Although M1910s would serve the Red Army in World War II, it was the modernized M1910/30 that would become the definitive Soviet MMG of the conflict. This introduced a range of improvements across the gun, aimed at improving both performance and manufacture. The firing mechanism was modified to allow the machine-gunner to fire with one hand, the gun had a separate firing pin and the fusee spring cover was lightened and reshaped. (The fusee spring restrained the rearward recoil of the operating parts.) The rear sight was simplified and improved and the water jacket received a drainage valve. The M1910/30 could be mounted on Sokolov, Kolesnikov

and Vladimirov mounts, but for anti-aircraft use it was found in flexible single- dual- and quad-gun anti-aircraft mounts – the last of which was designed by Degtyaryov – including mobile types mounted on the back of flatbed trucks.

The M1910/30 encompassed all the inherent reliability of the Maxim. Short-recoil operated (assisted by a muzzle booster), and with an ultra-reliable toggle-lock mechanism, the M1910 could fire belts of 7.62×54mmR ammunition at a cyclical rate of 300–500rd/min with astonishingly few malfunctions. The water-cooling system obviated the need for a quick-change barrel, and during the early years of World War II the water jacket was fitted with a large-aperture water-jacket filler cap, to allow snow and ice to be packed into the water jacket if fresh water was not readily available; this modification was inspired by encounters with Finnish Maxim M/32-33s during the Winter War. Other wartime modifications to aid manufacture included a feed block made of siluminium (a light silicon-aluminium alloy) and the removal of fittings for optical sights; wartime conditions rendered the latter something of a luxury.

Other Maxim variants

The M1910/30 was a solid performer, but ‘solid’ cuts both ways – it was still a heavy crew-served weapon, and something of a relic of former times, thus several efforts were made to create lighter versions. One of the most successful was actually not an infantry weapon, but rather an aircraft machine gun: the PV-1. This was an air-cooled variant with a slotted barrel jacket and a faster rate of fire of 750rd/min, achieved by adding a booster to accelerate breechblock return speeds. Accepted into service in 1928, the PV-1 became a leading Soviet fixed aircraft machine gun during the 1930s, fitted to a variety of biplane fighters, fighter-bombers and bombers; but by the time World War II broke out, it was already being superseded by newer aircraft machine guns. The emergency caused by the German invasion of the Soviet Union in June 1941, however, meant that many PV-1s were used either as ground-based anti-aircraft weapons, including triple-mounted versions set on vehicles and trains, or as infantry support weapons when affixed to the Sokolov carriage.



In this photograph we see Fedor Vasilievich Tokarev (right) posing with his son Nikolai in front of a Maxim-Tokarev (M-T) machine gun, plus another example of the same weapon disassembled on the bench. In total, just 2,450 M-Ts were produced in 1926–27, and Tokarev's efforts to improve the weapon became redundant as the DP came into service.
(Wikimedia/Public Domain)

During the inter-war years, there were two attempts to transform the M1910 into an air-cooled LMG, but neither of them was destined for success. In 1923, the Soviet Artillery Committee commissioned the Vystrel firearms school to design an LMG based on the Maxim and chambered in the standard Russian 7.62×54mmR cartridge. The first competitor for the Soviet LMG prize was the Maxim-Kolesnikov (M-K), the name acknowledging its designer, Ivan Nikolaevich Kolesnikov. The M-K was essentially an air-cooled version of the Maxim fitted with a strangely curved wooden stock and a bipod attached to a ventilated barrel jacket, and lightened not only by the omission of the water jacket, but also by the shortening of the barrel. It was fed from 100-round belts, held in drum containers.

In 1924, legendary firearms engineer Fedor Vasilievich Tokarev created his own version working on similar principles and layout, known as the Maxim-Tokarev (M-T). Following trials in 1925, the M-T was selected as the preferred type and subsequently became the first Soviet-produced LMG to be adopted for Red Army service, with some 2,450 being produced in 1926–27. The M-T would actually see service in the hands of Republican forces during the Spanish Civil War (1936–39) and also in Soviet hands during the Winter War, but by this time the weapon had ceased production,

Tokarev's continual improvements to the design making it impractical and expensive to manufacture.

DEGTYARYOV MACHINE GUNS

By far the most influential of the new generation of Soviet machine-gun designers was Vasily Alekseyevich Degtyaryov, who would provide the Red Army with an entire suite of machine guns, across the full LMG, MMG and HMG spectrum. His opening achievement was to give the Soviet military their first infantry LMG – the DP – which he began developing c.1922 and which, following trials and acceptance in 1926–27, entered service in late 1927.



Vasily Alekseyevich Degtyaryov ranks alongside Mikhail Timofeyevich Kalashnikov as one of the most important firearms designers in Soviet history. His experience of firearms was long-standing – his first job was as an 11-year-old working in the Tula armaments factory.

(Wikimedia/Public Domain)

The DP and DPM

‘DP’ stands for *Pulemyot Degtyaryova Pekhotny*, or ‘Degtyaryov’s infantry machine gun’, and in the West the weapon is variously described as the DP-27 or the DP-28. DP-27 is how the Soviets referred to it – there do not

appear to be any references to a DP-28 – but ‘DP’ is also accurate within the familial labelling.

The DP was a gas-operated, open-bolt LMG chambered in 7.62×54mmR with a flapper-locking mechanism (see the plate commentary of **The DP Exposed** for more detail) similar to the Swedish Kjellman-Friberg system, although Degtyaryov used gas piston engagement with the firing pin to unlock the weapon. The entire machine gun weighed 9.12kg unloaded and 11.5kg loaded, which represented a dramatic load reduction in comparison to an MMG such as the M1910/30, and it was generally simple in both use and construction – it contained only some 80 parts – which later made it ideal for surviving the challenging manufacturing conditions of war-production. The DP had several defining features, including an integral bipod and a large conical flash-hider, which was threaded onto the barrel. Unusually, it had a grip safety – a lever just behind the trigger guard had to be depressed for the weapon to fire (this action was naturally performed when the machine-gunner held the weapon for firing). Its most distinctive element, however, was the top-mounted spring-tensioned pan magazine, which could hold 49 rounds, though loading was standardized to 47 rounds (this instruction was stamped on the top of the magazine) to improve feed reliability. The pan magazine, which earned the DP the nickname *proigryvatel* (‘record player’), was actually one of the weaker elements of the weapon and its variants, being slow to load and easily damaged.



Two Red Army DP machine-gunners provide cover for an infantry assault, in a classic demonstration of the tactical purpose of LMGs. The machine-gunner in the foreground is not holding his weapon optimally, however; the left hand was meant to wrap around the rear stock. (Courtesy of the Central Museum of the Armed Forces, Moscow via Stavka)

The DP would be the standard LMG of the Red Army in World War II. It was a practical and generally reliable weapon, although it went through several iterations of improvements. Early versions had 26 transverse cooling fins on the barrel, but as many other manufacturers discovered, this contributed little to cooling and so they were removed from production in 1938. The problem of excessive barrel heating was also remedied in the 1930s by the introduction of a quick-change barrel mechanism (previously the barrel change had required some tool work). It was also discovered that the recoil spring's location near the barrel led to the spring being weakened through heat transfer, resulting in a loss of temper. In response, ventilation holes were introduced in the barrel jacket to aid the cooling of components.

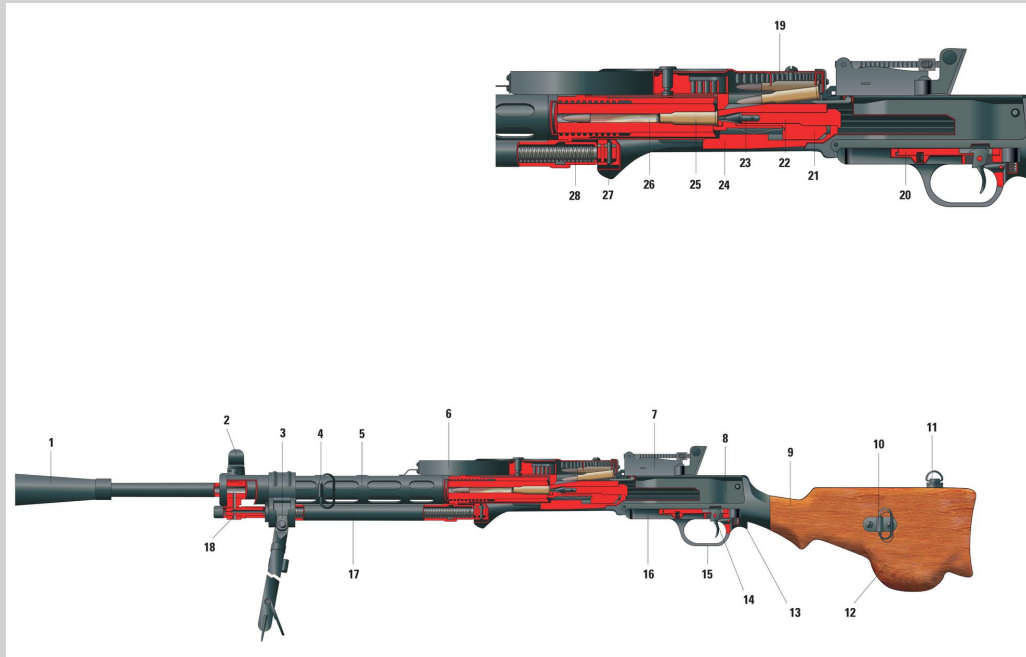


The most significant change in the DPM compared to the DP was the relocation of the recoil spring from beneath the barrel to the receiver, requiring a prominent spring housing projection from the rear of the receiver. This in turn meant that the grip method of the DP (with the firing hand wrapped around the front of the stock), and thus the grip safety, were no longer possible,

so the DPM acquired a pistol grip plus a thumb-lever safety on the right side of the receiver.
(D&B Militaria, www.dandbmilitaria.com)

THE DP EXPOSED

7.62×54mmR Degtyaryov DP light machine gun



1. Flash hider
2. Front sight
3. Bipod clamp
4. Front sling swivel
5. Ventilated barrel jacket
6. 47-round flat pan magazine
7. Rear sight (notch on sliding tangent)
8. Upper receiver
9. Stock
10. Rear sling swivel
11. Oil brush
12. Stock grip bulge
13. Grip safety
14. Trigger
15. Trigger guard

16. Trigger group housing
17. Gas piston tube
18. Gas port
19. Magazine cartridge guide pins
20. Sear
21. Bolt group
22. Bolt
23. Firing pin
24. Bolt carrier
25. Cartridge in chamber
26. Barrel
27. Barrel release mechanism
28. Return spring

The DP is a gas-operated weapon, the gas piston assembly running beneath the barrel. Its overall design is fairly simple. It is an open-bolt weapon – after loading, the cocking handle is pulled to the rear until a sear engages in a locking recess in the bottom of the gas piston (which is now under spring tension), restraining the bolt to the rear. When the trigger is pulled, the driving spring in the piston housing is released, powering the piston and the bolt group forward. A feed rib on the top of the bolt strips a cartridge out of the magazine guideways and chambers the round. Locking is achieved by two flapper locks, one either side of the bolt, being cammed into recesses in the receiver, an action that at the same time allows the firing pin (previously restrained to the rear by the locks) to drive forward, strike the primer and fire the cartridge. Gas from the propellant is tapped off from the barrel into the piston housing, driving the piston back and taking the firing pin with it. After 9mm of rearward travel by the operating parts, the firing-pin cam is removed from engagement with the sides of the flapper locks and the locks fold in again, with the firing pin held to the rear. By 25mm of rearward travel, the gas piston is no longer under power, and the empty cartridge case is ejected. The operating parts continue to move backwards under the recoil impulse until the force in the compressed recoil spring sends the bolt and gas piston forward again, to repeat the cycle until the operator releases the trigger.

DP DATA

Calibre: 7.62×54mmR

Operating system: gas

Locking system: flapper locking

Overall length: 1,282mm with flash hider

Barrel length: 604mm

Rifling: four grooves, right hand

Weight (unloaded): 9.12kg

Weight (loaded): 11.5kg
Feed mechanism: 47-round flat pan magazine
Rate of fire (cyclical): 500–600rd/min
Rate of fire (practical): 80rd/min
Muzzle velocity: 840m/sec
Effective range: 800m



A close-up photograph of the DPM's pistol grip and thumb-lever safety. Combined with the improved non-detachable bipod, which had a better radius of movement and was more robust, the DPM was indeed a superior weapon, with better handling and therefore improved accuracy. The weapon was presented to the State Defence Committee in August 1944 and approved for service. (D&B Militaria, www.dandbmilitaria.com)

The DP was used prolifically throughout World War II and beyond, but there was a further attempt to iron out some of its imperfections in 1943–44, when an improved version – the DPM – was developed and introduced in limited numbers. The DPM ('M' for 'Modernized') featured a strengthened bipod and relocated the recoil spring to a tube at the rear of the receiver. This negated the problem of recoil-spring heating, but required a redesign of the stock – a pistol grip was introduced.

The DA and DT

Subsequently, the DP was repurposed in two other contexts: as an aircraft machine gun (the DA: *Degtyaryova Aviatsionny*) and as a tank machine gun (the DT: *Degtyaryova Tankovy*). The DT was the standard Soviet tank machine gun of World War II. It had the same fundamental action characteristics as the DP, but with some signal changes to adapt it for armoured use, as typically the DT was installed in a ball mount. Ammunition capacity was increased with a 60-round pan magazine, but with the ammunition arranged in three layers, deepening the magazine but reducing its

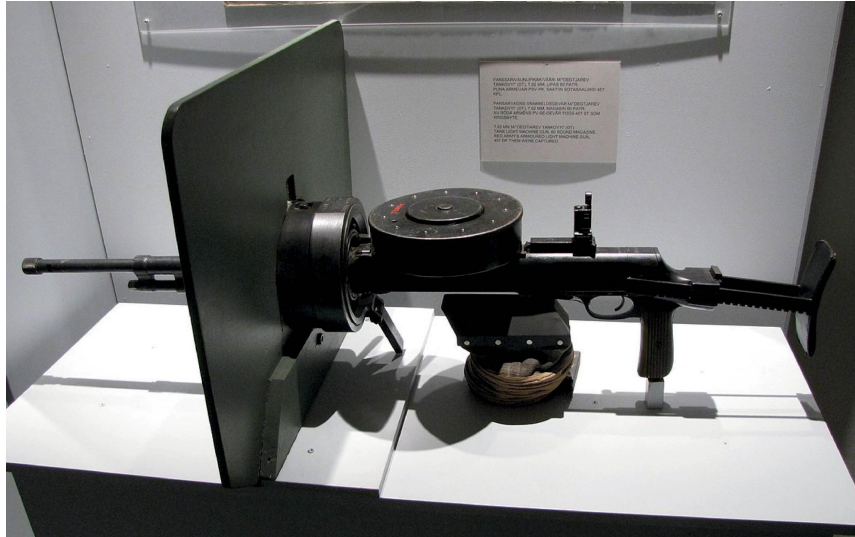
diameter compared to the infantry type. The barrel was heavier to reduce the frequency of barrel changes – always a clattering and elbow-banging procedure in the confines of a tank – and because of mounting requirements, the DT had a removable front sight and a redesigned rear sight of peep-type design, with a shorter sight radius than the DP. Because of the increase in the depth of the magazine, the rear sight stood up high from the top of the receiver. Both the front and rear sights were adjustable. The changes continued at the rear of the DT, the weapon having a pistol grip and a telescoping metal shoulder stock.





A Soviet tank driver takes aboard ammunition in September 1941, including many magazines for the DT machine guns. There are a total of 300 pre-loaded rounds of 7.62×54mmR ammunition shown here, with each magazine holding 60 rounds. (Hulton Archive/ Getty Images)

While the DT was primarily a tank machine gun, it came with a separate kit to convert it for dismounted use, should the tank have to be abandoned and the crew compelled to fight from the ground. (Given the shortages in Soviet front-line magazine guns, many DTs went straight into infantry hands anyway.) The kit consisted of the removable front sight (reattached for infantry use) and an attachable bipod. Configured for infantry fire, the DT looks distinctly ungainly compared to the DP, and by all accounts the firing experience was not as smooth. Nevertheless, it put rounds downrange, which meant that the Soviets could maximize their inventory of front-line automatic weapons.



The Degtyaryov DT was the tank version of the DP machine gun. This image shows it set in its ball mount. The bag concertinaed beneath the receiver was for catching spent cartridge cases as they ejected; a clip at the bottom of the bag opened for emptying.
(MKFI/Wikimedia/Public Domain)

Other DP variants

Degtyaryov also produced two unsuccessful DP variants, one in 1931 that dispensed with the barrel jacket and made some modifications to the gas system, and another in 1938, which used a Japanese-style hopper feeding system. Both failed to impress, the latter not least because the spring-loaded hopper lid was quite capable of chopping off a finger when released.

Before moving on from LMGs, it is worth noting some of Degtyaryov's other LMG designs that were developed during the war years, but production and major adoption of which fell just beyond 1945. The RP-46 (*Rotnyi Pulemet 1946*; 'Company level machine gun model 1946') was essentially a DPM but converted for belt-feed, with a heavier barrel, a three-position gas adjustment and a lever-action belt-feed mechanism. The RPD (*Ruchnoy Pulemyot Degtyaryova*; 'Degtyaryov hand-held machine gun'), by contrast, was a gas-operated squad LMG chambered for the new Soviet M43 7.62×39mm 'intermediate' cartridge (copied from the German 7.92×33mm *Kurz*), firing from an open bolt at a cyclical rate of 650rd/min. The visual signature of the RPD is its ammunition feed: a large drum container, hanging below the receiver and containing 100 rounds of ammunition in a non-disintegrating segmented belt. The RPD did not reach the front lines during World War II owing to production issues, but became one of the defining Soviet infantry support weapons of the Cold War era.

The DS-39

From Degtyaryov's LMGs, we make the jump to his heavier weapons. The first on the ascending scale was his attempt to design an MMG to replace the M1910/30. For all their fundamental reliability, the Maxim machine guns had their limitations. They were heavy bruisers to handle and had a water-cooling system that further added to their weight and the logistical burdens of operation. Internationally, the inexorable shift was towards air-cooled MMGs, and Degtyaryov sought to give the Red Army this type of weapon in his DS-39 (*Degtyaryova Stankovyy obraztsa 1939 goda*; 'Degtyaryov with mount of 1939'), which he had been developing since 1930. The DS-39 was a gas-operated, air-cooled weapon firing the rimmed 12.7×54mmR rifle cartridge and locking via the flapper-locking system, similar to that used on the DP. The DS-39 featured an adjustable gas regulator and also the option to fit a spring-loaded buffer that doubled the cyclical rate of fire from 600rd/min to 1,200rd/min. Its barrel was of the heavy type with multiple cooling rings along its surface; this feature and some other elements give the DS-39 an appearance akin to the later DShK. In wartime production, the barrel-change facility was improved to obviate the need for tools (previously a screw and screwdriver had been required). It was fed from the standard Soviet 250-round canvas belts and had twin spade grips (one trigger per grip), with a thumb latch on the left grip that had to be depressed before the gun would fire. Degtyaryov designed the weapon specifically for a new 11kg tripod mounting (lighter than competitor mounts).



The DS-39 MMG was intended as a replacement for the M1910/30. It was lighter and had sophisticated functions such as a variable rate of fire, but it suffered from acute reliability issues, including premature ignition of cartridges in the receiver and a vulnerability to dust and cold. Production ended in June 1941 after only 10,345 had been manufactured.

(Balcer/Wikimedia/[CC BY-SA 3.0](#))

The DS-39 seemed to offer a way beyond the Maxim, and it was officially adopted as the replacement for the M1910/30 in October 1939. The problem was that the DS-39 was simply not a reliable firearm. It had a complicated belt-feed system that frequently malfunctioned – not helped by having to accommodate the rimmed cartridges – and its bespoke tripod was unstable when elevated to its highest setting for anti-aircraft fire. Increasing the rate of fire through the optional buffer only exacerbated these problems. Thus in the end only 10,345 DS-39s were manufactured in 1940–41 at the Tula Arsenal, and most went to second-line troops; the front-line soldiers held on to their Maxims, which remained firmly in expanding production. The fate of the DS-39 was further sealed in 1943, when Goryunov's SG-43 was adopted, this being a far more convincing MMG option (see below).

The DK

Degtyaryov's first attempt at an HMG was the DK (*Degtyaryov, Krupnokalibernyi*; 'Degtyaryov, large calibre'), the first prototype of which appeared in 1930 followed by very limited production in 1933–34. The DK

was chambered for the 12.7×108mm cartridge and was gas-operated. (Initially the weapon was designed around a .50 Vickers cartridge, but the Russian round was adopted as a more powerful option.) Its real oddity as an HMG, however, was that it was magazine fed, drawing from a 30-round drum magazine. It quickly became apparent that this was unsatisfactory, so in the late 1930s Georgy Semyonovich Shpagin, who most famously designed the PPSH-41 submachine gun, helped out by developing a rotary-drum belt-feed mechanism for use with the DK.

The DShK

With this successful pairing the DShK (the ‘Sh’ in the name reflects Shpagin’s contribution to the weapon) was born and adopted for service in 1938, becoming the standard HMG for the Red Army during World War II and well beyond. The DShK is a substantial weapon, weighing 34kg (gun only). Much of that weight is accounted for in the very heavy barrel, which is fitted with cooling fins and also a highly effective muzzle brake. Despite its heft, the barrel unit has a quick-change feature. The DShK is a gas-operated weapon firing only in full-auto mode, with a three-position gas regulator. Internally the DShK is indebted to the operating mechanism of the DP LMG, including the flapper-locking mechanism, but everything is scaled up to cope with the formidable recoil of the 12.7×108mm cartridge – the chamber pressure at firing is 52,000psi. Shpagin’s rotary-feed mechanism is driven by an oscillating arm attached to the charging handle, which is in turn connected to the bolt carrier. As the cartridges are rotated around the feed drum, they are first delinked (the DShK uses a metallic-link belt in 50-round sections) then delivered up for feeding into the chamber by the bolt.



A view along the sight picture of a DShK, set on its tripod mount for anti-aircraft fire. We have a good view here of the Shpagin rotary-feed system and the continuous metal-link belt, the 12.7×108mm rounds in the belt widely spaced to work in conjunction with the DShK's low rate of fire. (Serge Plantureux/Corbis via Getty Images)

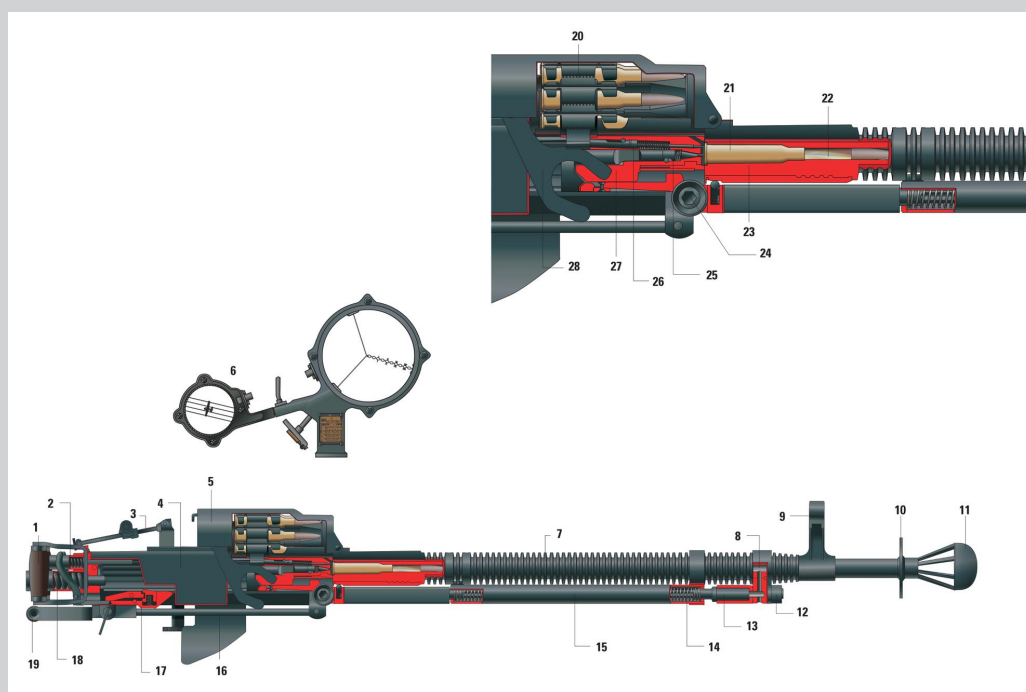
One particularly interesting feature of the DShK is that it has a very small circular charging handle, insufficient in itself to give the user adequate grip, but designed specifically for the insertion of a 12.7×108mm cartridge case, the projecting case then acting as the charging handle. This configuration has the virtue of making the charging handle unobtrusive when it is oscillating during firing. For mounting, the DShK used the wheeled Kolesnikov and Vladimirov mounts (with and without shields); for use in the anti-aircraft role the DShK was also fitted with an air-defence shoulder stock and an anti-aircraft sight.

Around 9,000 DShKs were produced during World War II. It was designed primarily for anti-aircraft use and light anti-armour capabilities, but improvements in armour during the wartime years severely curtailed the latter application against tanks, although the DShK remained more than capable of wrecking light vehicles and light armoured types. For air defence, in addition to firing from its tripod it was also pintle-mounted on ships and tripod- or pintle-mounted on the back of GAZ-AA trucks to provide mobile air defence. For the ultimate in air-defence machine-gunning, three DShKs could be triple-mounted as a single unit on a rotating platform. The 'Dushka' also provided heavy infantry support on its wheeled mount and for armoured

uses it gravitated upwards as a turret-mounted weapon on IS-2 heavy tanks and 152mm ISU-152 self-propelled guns, or as the main gun on the T-40 light amphibious tank. The DShK was an all-round solid performer, hence the weapon's continuing presence on today's battlefields.

THE DShK REVEALED

12.7×108mm DShK heavy machine gun



1. Trigger grips
2. Upper buffer assembly
3. Rear sight ladder (folded)
4. Receiver
5. Belt feed cover
6. Anti-aircraft sight (not to scale)
7. Barrel cooling ribs
8. Gas port
9. Front sight
10. Muzzle brake backplate
11. Muzzle brake
12. Gas regulator

13. Slide and gas piston rod assembly
14. Piston spring
15. Gas piston tube
16. Charging handle rod
17. Sear assembly
18. Lower buffer assembly
19. Charging handle
20. Ammunition belt link
21. Chambered cartridge (fired)
22. Barrel
23. Chamber
24. Expedient operating rod nut
25. Firing pin assembly
26. Ejector assembly
27. Bolt assembly
28. Feed operating lever

The DShK is, like other Degtyaryov machine guns, a gas-operated weapon with flapper locking, although on a far heavier scale owing to the 12.7×108mm cartridge. When loading, the machine-gunner lifts the feed cover and lays the first rounds of the belt on the rotating feed drum, placing the first round in engagement with the link stripper. He then closes the feed cover and manually pulls the feed operating lever several times to work the first cartridge around in alignment with the feed lips. During the firing cycle, four cartridges are in the drum at any one time, with two of them retained in their links. The DShK is an open-bolt gun. When it is cocked and the trigger pulled, the bolt is driven forward under the pressure of the bolt driving the spring, stripping the next cartridge out of the belt and chambering it. In the same way as the DP operating mechanism described previously, the DShK is locked by flapper locks, the positions of which also control the movement of the firing pin; as the flappers engage with the locking shoulder in the receiver, the firing pin can now go forward to strike the cartridge primer and fire the weapon. The DShK then goes through its recoil cycle, extracting and ejecting the spent cartridge case and sending the operating parts rearward until they strike the buffer at the rear of the weapon, before returning forward to continue the firing cycle.

DShK DATA

Calibre: 12.7×108mm

Operating system: gas

Locking system: flapper locking

Overall length: 1,625mm

Barrel length: 1,070mm

Rifling: eight grooves, right hand

Weight (gun only): 34kg
Feed mechanism: 50-round metallic-link belt
Rate of fire (cyclical): 550–600rd/min
Rate of fire (practical): 125rd/min
Muzzle velocity: 850m/sec
Effective range: 2,500m

The DShKM

The first production DShKs were issued to Soviet troops from 1940, and over subsequent years Degtyarov began mulling over improvements to the weapon. In February 1945 the first of the modernized versions of the weapon – the DShKM – entered small-scale production, although the type itself would not be officially adopted until 1946, hence its contribution to World War II was limited. The DShKM featured several key improvements, such as a simplified muzzle brake and a changed barrel attachment to the receiver. What was most significant, however, was a thoroughly revised feed mechanism, which now had bi-directional feed from disintegrating-link metal belts. The DShKM was even more robust and reliable than the DShK, and it would go on to become one of the most successful HMGs of the post-war age, rivalling the Browning M2 HB.



A DShKM set on its M1931 'Universal' mount, with the wheels detached and the mount set high for anti-aircraft use. The squared-off muzzle brake was a distinguishing feature of the DShKM compared to the original DShK, which had a bulbous 'bird-cage' type. (US Navy Bureau of Ordnance)

GORYUNOV'S SG-43 MACHINE GUN

Degtyaryov's machine guns were critical to the Red Army's shift to automatic firepower during World War II. While the DP provided the LMG, the DT the tank gun and the DShK the HMG, the PM M1910/30 continued to fill the MMG slot, following the failure of the DS-39. By 1943, however, there was a new MMG on the battlefield, this time the brainchild of Petr Maximovich Goryunov.

Goryunov's SG-43 was an entirely different animal to the M1910/30. It fired the same 7.62×54mmR rimmed cartridge at a cyclical rate of 500–700rd/min, but was gas-operated and air-cooled, feeding from either 250-round canvas belts or 50-round metallic-link belt sections. Unlike the DS-39, it worked well. More about the specifics of its operating mechanism are described in the plate commentary of **The SG-43 Unveiled**, but its principal

innovations (and difference from the other Red Army machine guns) were its propped breechblock locking and its spring-loaded cartridge extraction jaws. With its three-position gas regulator, the SG-43 could maintain appreciable levels of sustained fire, and it had a quick-change barrel. In terms of range expectations, its rear sight was graduated up to 2,300m for 1930 heavy ball round and up to 2,000m for 1908 light ball round (Chinn 1952: 63). For infantry use, it was mounted on a single-bar wheeled mount designed by Degtyaryov, complete with protective shield, and it also used the M1931 'Universal' mount.

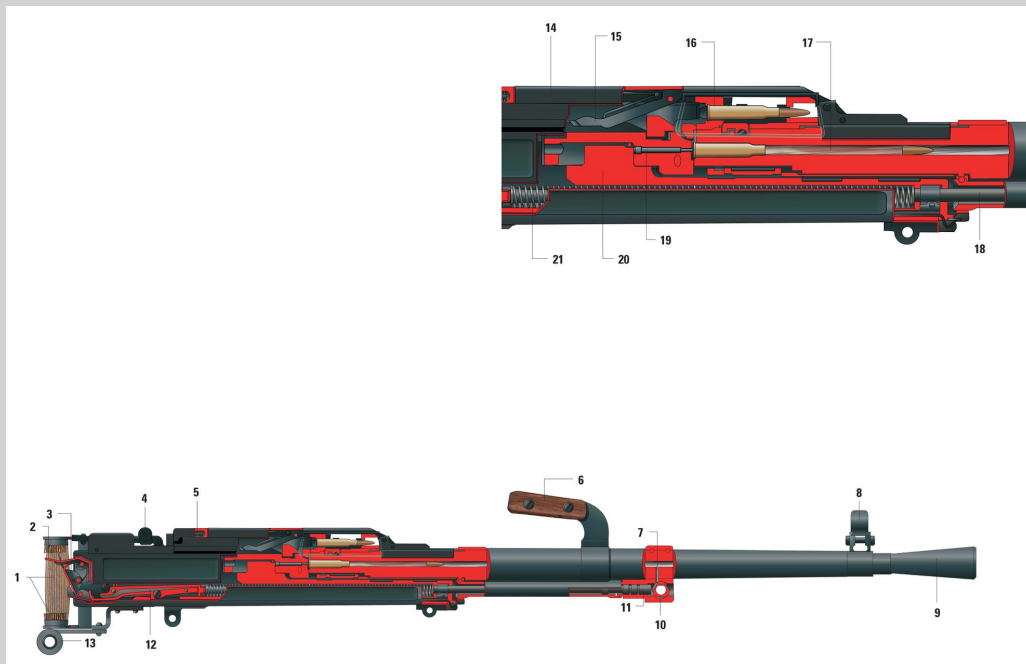
The SG-43 was a reliable weapon, as indicated by the fact that in its 'modernized' forms – the SGM – and the SGMT tank type (both post-war weapons), plus some other subvariants, it would go on to serve the Soviet armed forces as a standard weapon until the late 1960s. Its chief problem in World War II was simply that it arrived late in the conflict, at a time when Soviet factories were working flat out manufacturing the other types already in production. Only about 10,000 examples of the SG-43 were therefore produced. Nevertheless, it added another instrument of automatic fire to what was already a dependable family of Red Army machine guns.



A side view of a museum-piece Goryunov SG-43. Degtyaryov's light wheeled mount was based on that of the early DS-39 MMG, and it could be adapted for anti-aircraft use, with the shield acting as a base plate on the ground, and the curved top lip providing better purchase in the earth. (Vitaly Kuzmin/Wikimedia/[CC BY-SA 4.0](#))

THE SG-43 UNVEILED

7.62×54mmR Goryunov SG-43 medium machine gun



1. Firing grips
2. Safety catch
3. Trigger assembly
4. Rear sight (folded)
5. Feed cover latch spring
6. Barrel change handle
7. Gas port
8. Front sight
9. Flash hider
10. Gas regulator
11. Gas piston
12. Sear assembly
13. Charging handle
14. Feed cover
15. Feed lever
16. Cartridge in feed pawls
17. Bore
18. Operating rod
19. Firing pin
20. Bolt assembly
21. Recoil/return spring

To load the SG-43, the gunner first draws the bolt to the rear, where it is held open, and cartridges are inserted into the feedway, with the first cartridge placed as far left as it will go. The gunner then pulls the trigger, which allows the action to run forward. In this action, the first cartridge is gripped by the cartridge pulling device, which grips the rim of the cartridge. The gunner then pulls back the cocking handle again, and the cartridge is retracted from the belt and placed into a feed mouth, while the weapon is cocked ready to fire. On pulling the trigger, the gunner sends the firing mechanism forward under the power of the driving spring. Chinn clarifies that 'angular cams on the gas piston extension start the movement of the two spring loaded cartridge holding pawls to the right until they are behind the second round in the feedway' (Chinn 1952: 63–64). As the bolt arrives at the maximum extent of its forward travel, while chambering the cartridge, the block is locked via the camming action of a pin on top of the gas piston, the pin engaging with a curved slot in the bottom of the bolt. The movement of the bolt turns a locking piece at the bolt rear into a recess in the right-hand sidewall of the receiver. The cartridge now fires. For the next part of the cycle, again Chinn provides insight: 'The bolt is held securely locked behind the fired cartridge until chamber pressure reaches a safe operating limit. This factor is controlled by an orifice metering gas onto the face of the piston. Impact on the face of the piston starts the operating components rearward. The first fraction of an inch, the operating parts have free travel. The lug on the piston engages the unlocking slot in the bolt, pulling the aft end of the bolt out of engagement with its recess and drives the whole assembly rearward at great speed' (Chinn 1952: 64). As the bolt reaches its rearward travel limit, the next cartridge is gripped at the top and bottom of its rim by the cartridge pulling device, and as the operating parts return forward the cartridge is extracted and presented for feeding and firing.

SG-43 DATA

Calibre: 7.62×54mmR

Operating system: gas

Locking system: tilting breechblock

Overall length: 1,150mm

Barrel length: 720mm

Rifling: four grooves, right hand

Weight (gun only): 13.8kg

Weight (including wheeled mount): 41kg

Feed mechanism: 200- or 250-round canvas belt or multiples of 50-round metallic-link belt

Rate of fire (cyclical): 500–700rd/min

Rate of fire (practical): 80–100rd/min

Muzzle velocity: 800m/sec

Effective range: 1,100m



USE

Tactical fire support in total war

Despite their considerable power to inflict death and material damage, machine guns are still fundamentally small-unit support weapons, as compared to the area destruction wrought by artillery and air power. In terms of localized manoeuvre warfare, however, the Red Army of World War II leant heavily on its machine guns at squad to company levels. Streams of automatic fire, dependably directed at enemy troops and positions, enabled tactical opportunities for both attack and defence through a combination of attrition, damage and suppression.



This photograph from June 1942 shows a Red Army cavalry machine-gun team moving at a fast pace. Their M1910/30 machine gun is ready-mounted on the four-wheel *tachanka* carriage, with ammunition boxes and accessories stored at the far rear. (Sovfoto/Universal Images Group via Getty Images)

As the ‘Impact’ chapter will show, the weight of automatic fire that could be generated would be crucial not only to the evolution of Red Army tactics, but also to how the Soviet armed forces composed and developed their units, often reducing manpower while increasing firepower. In this chapter, however, we will focus our attention on the Red Army infantry use of LMGs, MMGs and HMGs, drawing on original manuals to explore how machine-gun tactics worked at squad and section levels. The use of HMGs and tank machine guns is also considered. This context allows us to explore how the

nature of the individual weapons, or the classification to which they belonged, influenced the tactical guidelines for infantry automatic fire. For ultimately, the machine guns were only as effective as the men who operated them and the officers and NCOs who provided the machine-gun teams with their direction and mission.

SOVIET LMGs IN INFANTRY SERVICE

In July 1944, Krasnoarmeyets Nikolai Mikhailovich Dyakonov, a DP machine-gunner with the 415th Rifle Regiment, 1st (Brestovsky) Rifle Division, was at the vanguard of the Soviet crossing of the Bug River, as the Red Army drove westwards towards Germany. The crossing was stiffly opposed, but Dyakonov, leading a small group of men, occupied a significant piece of high ground on the western riverbank. For two days, they clung on to this scrap of land, while the Germans threw superior volumes of manpower and firepower at them. Key to the Red Army's grip on the position was Dyakonov's DP, which ran through magazine after magazine, barrel after barrel, as Dyakonov brought fire down upon every German assault. By the time they were relieved, the small unit had killed more than 200 of the enemy, a large proportion falling to Dyakonov's DP. Such was his, and the weapon's, contribution that Dyakonov was made a Hero of the Soviet Union and his DP went on permanent display at the Central Museum of the Armed Forces in Moscow.



In Stalingrad in 1942, a DP machine-gunner uses a ruined stair-banister to give him a stable firing platform. The DP was a relatively accurate machine gun, its comparatively low rate of fire helping to control the dispersion of the shots, much like the British Bren gun.
(Sovfoto/Universal Images Group via Getty Images)

Such a story shows how even an LMG, in the right hands, can tilt the outcome of a local battle. When referring to the LMG in Soviet use in World War II, however, we are of course really referring to the DP/DPM, the standard LMG at squad level. As we have seen, the Fedorov *Avtomat* was produced in such minor quantities in the 1920s that it had little combat impact in World War II, putting in an inconsequential appearance during the Winter War. It was the DP, therefore, that delivered the weight of fire from within the infantry squad, although in the following descriptions of its tactical use we should bear in mind that the rifle squad, and the platoon and company of which that squad was a part, would typically be operating under the support-fire umbrella of far heavier weapons, including variously the M1910/30, the DShK and the SG-43, the applications of which will be considered in due course.

The LMG in the rifle squad

The DP provided the core of automatic firepower in the Red Army rifle squad (also referred to in some sources as a section), which in June 1940

was composed of 12 men (weaponry in parentheses): squad leader (rifle); assistant squad leader (rifle); light machine-gunner (LMG); assistant machine-gunner (rifle); grenadier (grenade launcher); grenadier's assistant (rifle); sniper (scoped rifle); and five riflemen (rifles). The composition of the rifle squad was intended to provide a useful spectrum of localized fire options, from the precision of the sniping rifle through to the area effects of the LMG. As the reality of combat soon proved, however, the rifle squad was an unwieldy unit for a single NCO (the squad leader) to control. The first change, in July 1941, was that the grenadier was dropped and the assistant grenadier became a standard rifleman in an 11-man rifle squad. On 10 December 1942, a more radical reorganization came with the Rifle Regiment Tables of Organization and Equipment (TO&E; *Shtat*) 04/551, with a reduction to nine men but in two different types of rifle squad. The Type A (Light) rifle squad was composed of the following: squad leader (rifle); assistant squad leader (rifle); light machine-gunner (LMG); assistant machine-gunner (rifle or carbine); and five riflemen (rifles). The Type B (Heavy) rifle squad was made up of the following: squad leader (rifle); assistant squad leader (rifle); two light machine-gunners (LMGs); two assistant machine-gunners (rifles or carbines); and three riflemen (rifles) (Sharp 1998: 117).

The reduction in manpower from 12 men in mid-June 1940 to nine men at the end of 1942 represented a shift in mindset in the Red Army, born of the hard realities of combat, reflecting the progressive realization that infantry battles were more often decided by who gained fire superiority than by volume of boots on the ground. One side of this shift was the mass-equipping of Soviet infantry units with PPSH-41 submachine guns, but the other was a proliferation of machine guns. Both the Type A and Type B nine-man rifle squads could be more easily coordinated around the DP fire by the squad leader and assistant squad leader (both NCOs). Type B rifle squads, furthermore, boosted the volume of automatic fire through a doubling of the LMG contribution to two DPs, with each machine-gunner supported by his own assistant gunner. This modification had an appreciable effect on the volumes of fire that the Type B rifle squad could generate. The DP had a practical rate of fire of about 80rd/min, so two DPs working together could generate 160rd/min (more *in extremis*), and with strong coordination from the squad leader and assistant squad leader one DP could be kept in action while the other was undergoing a magazine change or a barrel change.

In the Type B configuration, there was also a significant increase in the volumes of LMG ammunition that the rifle squad could transport into action. In action, the DP machine-gunner would only carry a single 47-round magazine, fitted to the DP (any more than that would be physically overtaxing); it was the assistant gunner who would do the heavy lifting when it came to ammunition, carrying three pre-loaded magazines in an ammunition can or bag, for a total of 141 rounds. So, while the Type A rifle squad transported 188 rounds of pre-loaded DP ammunition, the Type B rifle squad had 376 rounds, which with intelligent conservation of fire and, again, coordination between the machine-gunners, could make a significant difference to both the intensity and the duration of fire. In turn, it could also mean less-frequent trips back to the central company ammunition store, although as the DP fired the same cartridge as the regular infantry rifle, finding ammunition to reload the pan magazines might not have been problematic, depending on the wider ammunition-supply situation.



A DP gunner and assistant gunner take aim in an urban combat setting. The DP's bipod was detachable (which meant it could also be lost) and was prone to buckling under hard use, a problem rectified in the later DPM. (From the fonds of the RGAKFD in Krasnogorsk via Stavka)

Further multiplications of firepower become evident when we broaden our focus to rifle platoon level. Each rifle platoon consisted, at least on paper, of two light and two heavy rifle squads. Theoretically at least, therefore, the rifle platoon of 1943–45 had six LMGs and a total of 1,128 rounds of in-magazine ammunition; we can triple these figures for a rifle company, which had three rifle platoons. As always, however, the reality of war can be a long

way apart from the theory. In practice, the Red Army rifle platoon typically consisted of three rifle squads rather than four, or of four reduced-strength rifle squads of six men each; this latter option became more common in the final two years of the war, when combat losses were becoming truly problematic. Yet the concentration of the Red Army rifle squad around the DP was part of a general Soviet shift to automatic fire, which we will explore more deeply in the 'Impact' chapter. Further organizational adjustments increased the volumes of submachine guns (SMGs) that were issued within the rifle squad and within the company, and it became ever more common for assistant machine-gunners to be issued with an SMG rather than a rifle. This made sense because although the DP was not a heavy support weapon, like all machine guns it would still attract much of the enemy's attention and fire once its position was identified. It was for this reason that a well-trained DP team would move to alternate cover after several bursts of fire, to prevent the enemy bringing their weapons to bear on a single position. For the assistant machine-gunner, the SMG was not only a more compact weapon to carry along with heavy and bulky ammunition boxes; its rapid rate of fire meant he was better equipped to defend the machine-gunner should the enemy approach to close quarters.

Operating the DP

To operate a DP, first the distinctive pan magazine had to be loaded. This activity required some manual dexterity, as it required dropping the cartridges into the magazine while rotating the two halves of the magazine housing in relation to one another, to apply tension to the internal magazine spring. To do this, with the magazine upside down the machine-gunner would hook his finger into the D-ring screwed to the upper surface of the pan and pull the upper housing towards himself and against the spring tension, so that the first cartridge guide pins in the lower housing were visible and aligned through the magazine feed port. When this was so, he would drop in a cartridge, which sat neatly in the cartridge guide pins with the rim against the outer edge of the magazine. Then he would index the magazine on to the next cartridge space, drop another cartridge in, and so on, 47 times, until the magazine was full and the internal magazine spring was under maximum pressure. Note that the D-ring on the outer surface of the magazine marked the position of the first cartridge that was inserted, and thus when the magazine rotated during firing the position of this pin gave a good indication as to how

much ammunition was left in the magazine. Originally, a cord or leather pull tag was tied to the upper magazine screw instead of a D-ring, but this quickly proved liable to deterioration and breakage in field conditions, so was replaced by the more durable metal fitting, likely inspired by a Finnish innovation.

Magazine loading was a tedious and time-consuming process to do by hand – and definitely something to be performed before heading into combat. There were mechanical loading devices that speeded-up the process. One, called the ‘Rakov’, used a ratchet mechanism to turn the magazine under tension; the mechanism engaged with the notches in the upper surface of the magazine while a hopper fed the cartridges down into the magazine. The Rakov was a large bench-mounted system, and appears to have been relatively rare. More common was the ‘Barkov tool’, which used a simple hand ratchet system to turn the magazine, while the cartridges were again dropped in by hand.

To load the DP with a filled magazine, first the dust cover over the upper receiver was slid forward to expose the chamber and the charging handle (underneath the receiver, on the right) was drawn back to lock the bolt to the rear. The magazine could now be inserted, the machine-gunner engaging a locking piece on the front of the magazine with a clip on the top of the barrel jacket and then swinging the magazine downwards so that the feed lips of the magazine engaged securely with the open top of the receiver. To remove the magazine, the machine-gunner would pull back on the magazine release lever, which was located around the base of the rear sight.

With the magazine loaded, firing the DP was simply a matter of gripping the stock – an action that automatically released the squeeze-type safety lever just behind the trigger guard – putting the sights on target and pulling the trigger. The sights themselves consisted of a fixed front post and an adjustable rear notch sight on a sliding tangent, graduated up to 1,500m, although that range was a little optimistic, the DP being most effective over about 800m.



A machine-gunner fills the pan magazine of his DP, using his right hand to grip the casing of the magazine against the internal spring pressure while using his left hand to push cartridges one at a time through the feed lips. Five different types of cartridge were available in 7.62×54mmR for the machine gun, as listed in the April 1941 manual. The Model 1908 was the standard lead-cored ball round, with flat base and a 150-grain/9.7g bullet; it had an unpainted tip. The Model 1930 was a heavier round (182 grains/11.8g), and combined with its better ballistic coefficient from its boat-tailed design and higher muzzle velocity, it had superior penetration compared to the Model 1909. This cartridge had a yellow painted tip. The steel-cored Type LPS was an armour-piercing round, used for penetrating light armour and protected barriers; it had a black painted tip. T30 tracer was introduced in 1930, and featured a tracer compound that burned white, although the tip of the bullet was painted blue. The zeroing round featured an explosive compound so the point of impact was visible to the gunner when zeroing the weapon. The tip of this bullet was painted red. (Nik Cornish at www.stavka.org.uk)

The DP was best fired from its integral bipod, to give the machine-gunner a reasonable degree of stability and accuracy under full-auto fire. Bipod firing was further recommended by the fact that as the pan magazine emptied, the DP's centre of gravity shifted, altering the point of aim for the unwary machine-gunner. The DP was also light enough, however – just – to be fired from the hip or even the shoulder if the machine-gunner had the upper-body strength to manage to do so. Firing from the hip could be assisted by wedging the stock against the hip and gripping one of the bipod legs, to create a stabilizing tension against the body. Whatever the position of fire, the fact that the DP had a comparatively sedate cyclical rate of fire of 500–600rd/min meant that the weapon was highly controllable. The slow rate of

fire – at least slow when compared to ammunition-eaters like the German MG 42 – was also important given that the DP was feeding from a 47-round magazine, the contents of which would be consumed too quickly if the weapon fired at a faster rate.

A normal practical rate of fire was defined as about 80rd/min, delivered in short bursts of 3–6 rounds, with an interval after each burst to aid cooling and to stop the machine-gunner giving away his position too easily. Of course, more rapid fire could be delivered if the situation demanded it (the gas regulator could also be adjusted to speed up the rate of fire), but manual advice was that the DP's barrel needed swapping out after 250–300 rounds had been fired, otherwise there was a danger of overheating and malfunction. Because the DP is an open-bolt gun, the bolt stays open at the end of every burst, improving air circulation and cooling across the chamber, thereby reducing the risk of rounds 'cooking off'.

The barrel-change procedure on the DP varied according to the model. In the original model, the barrel change was comparatively laborious, although it could still be performed relatively quickly by a well-trained crew. The flash hider and the gas cylinder nut were first unscrewed, which allowed the cylinder to slide to the rear of the gas cylinder nut. Once two securing pins were removed, the barrel could be turned (it was secured via an interrupting thread) by using a tool that was provided on the rear of the flash hider (Chinn 1952: 39). The subsequent quick-change barrel dramatically speeded up matters. The operator simply depressed a button on the left side of the receiver, which allowed the barrel to be rotated and pulled out from the front end; to insert a new barrel the process was simply reversed, and the entire barrel change could be performed smoothly in a matter of seconds.

The DP is popularly regarded as typifying the Soviet reputation for solid build quality and reliability, and pre-war tests did indeed produce some impressive reliability data. Intense firing tests on two DPs in 1926–27, which absorbed 40,000 rounds, gave a stoppage rate of just 0.3–0.5 per cent with little corrective maintenance (Bolotin 1995: 139–40). Yet even the most punishing weapon tests never seem to be quite indicative of reliability in field conditions. Certainly, stoppages were far from unknown, as indicated by the variety of manual guidance about how both to prevent and to clear them. The 1943 edition of the *Partisan's Companion* – a practical guide to insurgency provided by the Soviet state to partisan bands – refers to the importance of conducting daily checks on the DP, including ensuring that the

barrel was properly mounted in the receiver, the upper magazine seating it was protected by its dust cover, and the trigger and safety switch were in good working order (Grau & Gress 2011: 64–65). The advice to prevent jamming includes: taking care during the loading of the magazine; avoiding barrel overheating when firing; oiling the weapon properly with winter oil during freezing winter months (and conversely removing thickened oil from moving parts); and regularly cleaning the gas regulator, piston cylinder and chamber. George Chinn, in his huge 1952 study of Soviet machine guns, gave further information about the factors that affected the DP's reliability, from Soviet sources:

One of the most serious deficiencies is the existence of large flat bearing surfaces in the mating operating parts, which could interfere with both aim and cycle of operation.

The most prevalent malfunction to take place during combat has been listed by the Russians as insufficient recoil, due to the following reasons: (a) penetration of dirt into the mechanism [chiming with what the *Partisan's Companion* manual said about keeping the dust cover closed], (b) too-thick lubricant on the mechanism, especially in winter, (c) choking of the gas port regulator by carbon or dirt, and (d) escape of gas between the gas regulator and the piston, brought about by a defect in the manufacture of these pieces.

On the counter-recoil stroke, the most common stoppages have been listed as (a) dirt getting into the action, and (b) too-thick oil on the recoiling parts.

The magazine rotates through the action of a wound spring. This feature is often found to be to blame for failures especially when the spring becomes too weak to turn the disk the one space to index the incoming round. (Chinn 1952: 41)



A young Red Army soldier proudly displays his DP machine gun. This view clearly shows the indentations on the top of the DP magazine, used for engagement with auto-loading machines.
(Keystone/Getty Images)

Chinn's sources provide a useful insight into the reliability issues affecting the DP. Certainly, it does not come across as an invulnerable weapon. The list of issues separates into mechanical problems (part through design, part through standards of manufacture) and issues of field maintenance. Regarding the former, it is certainly true that many of the World War II guns have a crude finish – the industrial emergency created by the German invasion of the

Soviet Union, including the forced relocation of two key machine-gun factories (No. 2 at Kovrov and No. 366 at Tula), and the need to rush weapons to the front, certainly put the squeeze on quality-control processes. As for field maintenance, this was a matter of training and unit discipline, making weapons cleaning a priority even during those brief breaks in combat when exhausted soldiers might be tempted to do nothing more than rest.

THE LMG's TACTICAL ROLES

The purposes of any LMG are typically threefold: (1) provide localized suppressive fire for infantry squad/section offensive manoeuvres or defensive actions; (2) inflict attrition upon enemy troops; (3) impose material destruction upon lightly protected positions and vehicles. Soviet World War II manuals were a little more specific regarding the DP, stating that the weapon was to be regarded as the principal fully automatic weapon for destroying groups of enemy soldiers or point targets out to a range of 800m, with an additional role of engaging low-flying enemy aircraft out to a range of 500m (Grau & Gress 2011: 64). In these roles, the DP was largely a success although, as we have seen, its reputation for superlative reliability amid the worst conditions of the Eastern Front has to be taken with some measure of caution.



A DP machine-gunner (right) and a Simonov anti-tank rifle team scan the ground from the prone position in support of a Soviet armoured push. The DP machine-gunner would be especially seeking to suppress enemy machine guns or infantry anti-tank teams. (Courtesy of the Central Museum of the Armed Forces, Moscow via Stavka)

The LMG in the attack

We get a clear sense of how the Red Army intended its LMGs to be used in the manual *Combat Regulations of November 1942* (Sharp 1998). In its description of rifle-squad tactics, we see the LMG team acting as a pivot point for both offensive actions and defensive responses, giving the rest of the rifle squad the base of fire upon which it can manoeuvre. First looking at 'The Rifle Squad in the Attack', the manual explains textually and diagrammatically how a nine-man rifle squad moves up to the attack position in column, the squad leader at the very front, but with the machine-gunner directly behind him and the assistant machine-gunner next in line. At the appropriate moment, or indeed as the advance formation, the rifle squad moves from column to skirmish line, a loose and staggered line of personnel parallel to the front of attack. How the skirmish line is formed is interesting in relation to the LMG team. If it forms into a 'centred' skirmish line, the squad leader stays in position and the other members of the rifle squad fan out either side of him. In the case of skirmish lines to the right or left, all members of the rifle squad form up to one side or the other of the squad leader, who is on the extreme flank. In all cases, the machine-gunner and the assistant machine-gunner remain closest to the squad leader, indicating the importance of the squad leader being able to give instant direction over the support fire. Paragraph 63 explains how, once an attack is launched, the LMG team is directed to each new position by the squad leader, the rest of the rifle squad providing covering fire while the LMG team move forward, then the LMG team putting down cover fire to allow the rest of the rifle squad to move up, in a classic demonstration of bounding fire and manoeuvre.



This photograph, taken c.1944, usefully shows the close cooperation between a DP machine-gunner and assistant machine-gunner, the latter carrying additional magazines in an ammunition can. The machine-gunner illustrates how the DP could be carried, and fired if need be, from the hip during an assault, the sling being a useful addition to help manage the gun's weight. (Keystone/Getty Images)



Belorussian partisans make an attack on German forces in 1944, with a DP machine-gunner providing the covering fire, a spare 47-round magazine at the ready. Notably, this DP does not have its conical flash-hider fitted; possibly it was removed because it was damaged or the partisans received it in that condition. (Sovfoto/Universal Images Group via Getty Images)

If at any point during the assault the troops are pinned down by ‘unsuppressed’ enemy fire, the squad leader or the platoon commander directs the LMG teams to fire directly on these threats. The manual here specifies the ranges of engagement: while the LMG teams can open up on targets at up to 800m range, the best shots among the riflemen are free to fire at 600m and all the rest can add their contribution at 400m. If the advance can resume, then eventually it will reach the point at which the rifle squad can physically propel itself into the enemy positions.

The manual makes clear that close-quarters combat in the enemy’s positions and trenches is to be conducted with hand grenades, bayonets and SMGs. Certainly, at more than 1m long and weighing 11.5kg fully loaded, the DP would not be the most nimble close-quarters weapon. Yet the manual states explicitly (Paragraph 77) that the LMG team is to make the attack with the rifle squad and to fire on the move, which the machine-gunner would do either by firing from the hip or by regularly dropping into firing positions and putting down bursts of fire.

Should the attack play out successfully, and the enemy positions are taken, the LMG team now starts to shift into a defensive role, to hold off any immediate counter-attacks. The manual states that the rifle squad immediately digs into its new positions, with the LMG team targeting resurgent enemy infantry. If the enemy pushes back with a combination of armour and infantry, the LMG team should resist the futile temptation to fire at the tanks and concentrate its efforts on the infantry advancing behind the armour. The combat regulations make clear that the rifle squad is not a unilateral entity making its own tactical decisions, but rather the success of the assault relies heavily upon coordination between neighbouring rifle squads and platoons, especially in putting down mutually supporting LMG fire, and by working with the heavier support weapons.

The LMG in the defence

Having outlined the principle of a rifle-squad attack, the combat regulations proceed to consider the defence, a quite different tactical challenge. In a well-prepared and defensive line, of course, there would be, or rather *should* be, weapons of far greater destructive force than LMGs available to repel a major enemy attack. The Eastern Front was a vast and complex theatre, however, and often minor units would find themselves anxiously holding smaller and more localized defensive outposts during the ebb and

flow of operations. A rifle squad was capable of holding a position about 40–50m wide, depending on the terrain. The LMGs would be emplaced in combat trenches and given established fields of fire over expected routes of enemy attack. The sweep of the LMG fire would ideally be broad enough to intersect with neighbouring rifle-squad machine guns, to close out any dead zones of possible advance, but the fire scheme also had to take into account fields of fire to the sides and rear of the positions, should the enemy manage to perform flanking or encirclement manoeuvres.

The regulation advice on defensive actions repeats the stipulation that the LMG could begin to put down fire on attacking troops at 800m distance, concentrating fire on pre-attack reconnaissance troops, enemy units gathering in assault start positions, and forces advancing and manoeuvring for advantage. In practice, however, the stipulation that the rifle squad should open fire at the greatest practical range (Sharp 1998: 24) was frequently ignored. Long-range fire theoretically means that the attacking enemy suffers attrition from the distant start position of their advance, but in reality such attrition was more convincingly delivered by artillery, mortars and HMGs, rather than LMGs and rifles. Furthermore, the earlier the enemy could identify the firepower composition of the defensive positions, the more they could then adapt their tactics to work around those obstacles. Thus it was actually common for Soviet defenders (according to German accounts) to withhold their LMG and small-arms fire until the enemy was extremely close, usually within 100m of their positions. The sudden eruption of fire at this range often inflicted heavy casualties in the immediate seconds, plus it forced the German units to go to ground under the fire, with more limited options for manoeuvre.



Soldiers of the 3rd Ukrainian Front engage in street fighting in Budapest, Hungary, in 1945. The DP machine-gunner, given close-quarters protection by the assistant machine-gunner who is armed with a PPSH-41 SMG, would mainly be scanning windows, rooflines and towers for enemy snipers and machine-gunners, zeroing in on muzzle flashes. (Sovfoto/Universal Images Group via Getty Images)

SOVIET MMGs AND HMGs IN INFANTRY SERVICE

While Soviet LMGs generated support fire in a small-unit context, ultimately they were light weapons with definite physical limitations upon the volumes of fire they could run through the barrel. The heavier weight of lead, therefore, came from the dedicated MMG squads established within infantry companies, and within entire machine-gun companies. (The higher levels of machine-gun distribution within the wartime Red Army are explained in the 'Impact' chapter below.)

MMG squad organization

Soviet MMG squads were most commonly armed with the PM M1910/30, but also the SG-43 and, more rarely, the DShK, although the DShK was mainly utilized for anti-aircraft fire. All were *gruppovoe* (crew-served) weapons, and therefore the effective use of these types of machine guns required close coordination between the members of the machine-gun squad under stress, with each man embracing the responsibilities of his role regardless of what conditions combat, the environment and fatigue placed upon him.

The personnel composition of the company machine-gun squad could change a little depending on the unit context and the period of the war, but by *Shtat* 04/550 published in December 1942 it consisted of one NCO section commander (usually a sergeant or junior sergeant), one gunner armed with an M1910/30 or (later) SG-43, three ammunition carriers (some of whom would also act as assistant gunners) and one horse driver, to operate the horse-drawn carriage options.



The Finnish Army had a long historical familiarity with Maxim machine guns, hence would have had no problem putting this captured Red Army M1910 (the earlier model distinguished by its smooth barrel jacket) into service against its former users. (Nik Cornish at www.stavka.org.uk)



Soviet machine-gunners lay down fire from their M1910s during the Winter War with Finland. The absence of a top-mounted filler cap on the water jacket of the foreground machine gun indicates that this is one of the early Maxims, although it has acquired the corrugated-steel water jacket rather than the first smooth non-ferrous types. (Sovfoto/Universal Images Group via Getty Images)

Operating the M1910/30

The roles of each member of a machine-gun squad are most clearly laid out in the *Handbook for the Commander and Soldier of the Machine Gun Squad*, published in July 1941, a month into the shock of Germany's Operation *Barbarossa*. This manual, published more than a year before the issue of *Shtat* 04/550, was based on *Shtat* 04/401 of April 1941, which established the size of the machine-gun squad in a rifle company as five plus the horse driver or, for the machine-gun squad in a machine-gun company, seven plus the horse driver. (Some machine-gun squads might also have had two machine guns rather than just one.) The manual breaks down the composition of the machine-gun squad personnel as follows: commander/squad leader; observer; gunner; assistant gunner; ammunition carrier; and horse driver. Looking at these roles in a little more depth, and then going on to explore machine-gun squad tactical guidance in later publications, says much about the capabilities and limitations of the M1910/30 and (sometimes by implication) the SG-43.

The **squad leader** was the coordinating and commanding centre of the machine-gun squad, with oversight across both its human and technological aspects, from garrison to combat. The April 1941 machine-gun squad manual explains his general responsibility for the actions and efficiency of the machine-gun crew and the condition of all the machine-gun squad's equipment – the machine gun and its mounts, ammunition, instruments and spare parts, storage facilities, means of transport, horses and equine equipment, etc. On the march, the squad leader would explain the mission, give movement orders and set agreed signals, then make an ongoing assessment of the condition of the men and horses on the march and ensure that the machine-gun squad's members had all the relevant logistics to support their efforts. In combat, the squad leader had to liaise constantly with platoon and company commanders to ensure that the fire support provided by the machine-gun squad was fully integrated into the tactical plan and the evolving situation, while identifying new targets of opportunity and issuing orders for machine-gun squad actions.

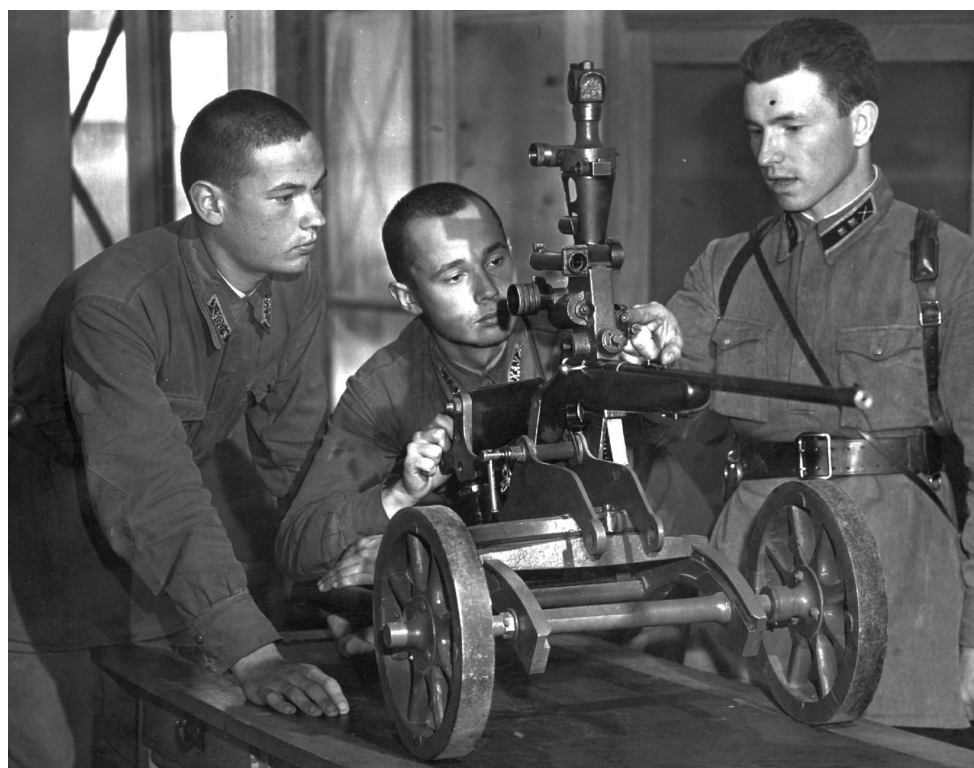
The **gunner** himself was not just a machine operator, running belts through his weapon in response to commands from the squad leader. Rather, he was required to have a deep understanding not just of his weapon – its operation, maintenance, ammunition types, etc. – but also of the systems of gun transportation, the tactical considerations of gun emplacement (see below)

and how to respond with personal initiative to the threats in front of his muzzle. He also had to ensure that the weapon and all of its associated items of kit were kept functional and ready.

The April 1941 machine-gun squad manual provides some specific directions for inspections of the M1910/30. The gunner should make seven daily checks (Goldovt-Ryzhenkov 2014: 41). First, he should assess whether metal parts are affected by rust, dirt, dents or scratches, or if there are any cracks in wooden parts. Second, he should check that the front and rear sight mechanisms are undamaged and function properly. Third, he should establish that the barrel and recoil plates move correctly. Fourth, he should check that the recoil spring is properly tensioned. Fifth, he should ensure that the toggle-lock and feed-block mechanisms function smoothly. Sixth, he should check that the mechanisms for adjusting vertical and horizontal aim are working properly. Finally, he should ascertain that the condition and the mounting of the shield, booster, booster cap, plugs and chains are satisfactory. (In these inspections the gunner was following routines set down for the original Maxim-Vickers weapons supplied to Russia.)

Other regular inspection duties included checking the M1910/30's front and rear seals – asbestos string coils preventing leakage from the water jacket – to ensure that they were coiled and fitted properly. The gunner also needed to fill the water jacket with the right fluid for the season, which in summertime meant straight water, but in winter meant a 50:50 mix of glycerine and water, to prevent the fluid freezing solid. In sub-zero conditions, correct winter lubrication of parts was vital. Through long experience of arctic-level winter conditions, the Soviets had developed standard gun lubricants which could resist temperatures as low as -50°C , but if a machine gun did jam up the gunner would typically clean it thoroughly, lubricate it with kerosene, fire it to draw the liquid through, before lubricating it normally. In particularly severe temperatures, he would keep the weapon covered or inside a hut or vehicle, to limit its exposure to the cold and prevent the weakening and malfunction of vulnerable parts such as firing pins, springs, gas pistons and trigger mechanisms. He also had responsibility for a variety of firing instruments. These included an optical sight, an aiming circle (an instrument for measuring horizontal and vertical angles and magnetic azimuths for gun-laying), an angle, a level and a range-finder.

The gunner was also responsible for ensuring that the belts were properly arranged, particularly in terms of the types of cartridge and the ratio of ball to tracer rounds, and that the cartridges were correctly held in the canvas guides or metal links. In combat, the gunner had to be especially careful to control and monitor ammunition consumption. The official advice was to report to the squad leader when half of the ammunition had been consumed, and only to use ‘reserve stock’ – which consisted of a single 250-round belt – when directly ordered to do so by the squad leader.



Students at the military artillery academy in Moscow learn the fundamentals of operating a machine-gun optical sight, the Maxim typically fitted to this Sokolov mount replaced by a small-bore bolt-action rifle to provide a more economical option for instruction. (Picture Post/Hulton Archive/Getty Images)

In all his efforts, the gunner would be aided by the close ministrations of the **assistant gunner**. His primary roles were to help the gunner move the machine gun to the designated firing position and prepare that position for effective combat use. At the same time, he would pay particular attention to the Maxim's water jacket, ensuring that there were no leaks, that the booster cap was correctly fitted and that the belts were in good condition.

When given the command *k boyu* ('to battle') the assistant gunner would lock the ammunition can onto the machine gun and remove the booster cap from the booster. He would then open the steam hose inlet on the water jacket, attach the steam hose and position the end of the hose to the rear or in a condensing can. (The steam hose released steam that built up in the water jacket as the fluid boiled under the heat of the barrel.) He would then open the viewing port in the gun shield, and open up the ammunition box and ensure the belt was correctly configured for feeding.



The meagre cover created by this Maxim team – nothing more than a small bank of scraped-up earth – would do little to stop return fire, likely indicating that the unit was expected to move quickly forward once charging troops had reached enemy positions. (Bettmann/Getty Images)

Emplacing the MMG

As a tactical rule, the MMG squad would emplace its weapon in a camouflaged position with good views over the terrain ahead. The 1942 regulations advised against positioning the weapon in high-visibility positions, such as the crests of hills, on the outer edges of woods or villages or next to particularly prominent and isolated features in the landscape, such

as large freestanding trees or isolated houses. The machine-gun position would consist of three elements: cover (the fighting position), the firing position (the placement of the weapon in the fighting position) and an observation post, to observe the effects of and correct the fire. If time allowed, the squad leader, gunner and observer would work together to produce a sector sketch, a visual reference guide of the terrain, noting down elements such as ranges to key objects, positions of neighbouring machine-gun and support units and the positions of both friendly and enemy units, and permissible arcs (vertical and horizontal) of fire. The team might also embed sector stakes – short pieces of wood or metal driven vertically into the ground – to provide a visual guide to the arcs of fire, preventing them from over-traversing and firing on their own troops. Ideally, the location of the firing position would allow the machine guns to fire across the flanks of the attacking enemy, to maximize the volume of enemy within the oval ‘beaten zone’ of bullet impacts.

THE MMG’s TACTICAL ROLES

The MMG squad in many ways duplicated the tactical roles of the LMG teams, just with heavier weaponry capable of more sustained fire over longer ranges. Yet the different fire characteristics of the MMG squad did expand its tactical remit in several new directions. The November 1942 combat regulations defined two main purposes of the MMG squad as being to provide support fire to advancing infantry and to defend Red Army positions. Its third purpose, however, was quite different from that of the LMG teams – to support armoured counter-attacks by targeting and destroying the crews of enemy anti-tank weapons at long ranges.

Before describing the tactics of the MMG squad in both attack and defence, the November 1942 combat regulations laid down some general principles of managing machine-gun fire. Reflecting the upper range of the Maxim, the regulations explain that the machine gun can deliver effective fire out to 1,000m range, but can fire suddenly at ranges of 600m or less. Indeed, an MMG squad might be designated as an ‘ambush’ section, positioned along the path of expected enemy movement and given authorization to fire on its own initiative against targets of opportunity. The gunner was ‘forbidden’ to let out long, continuous bursts of fire, however, for the simple reason that they would reveal his position to the enemy and invite his own destruction through focused response fire.



Soviet troops sprint forward during a counter-attack against German forces in July 1943, with a Maxim team providing supporting fire. When firing through attacking units, machine-gunners were taught to estimate (and limit) their arcs of fire by using finger widths, holding their fingers up to the landscape in front of them to estimate safe zones of fire. Note the extra ammunition box on the parapet. (Max Alpert/TASS/Photo by TASS via Getty Images)

The MMG in the attack

In support of an attack, the November 1942 combat regulations described the four purposes of the MMG squads (Sharp 1998: 34). First, they were to cover the advance of the infantry from the start of the assault, targeting enemy firing positions. Second, they were to engage the crews of enemy anti-tank guns, infantry anti-tank weapons (man-portable rocket launchers), machine guns, anti-tank rifles and mortars. Third, they were to extend the fire to allow the attacking troops to penetrate the enemy positions. Finally, they were to repulse enemy counter-attacks.

Unlike the LMG teams, the MMG squads would not be advancing at the front of the infantry lines. Rather, they would be positioned either between or to the sides of the rifle units, with clearly defined fire sectors, including delivering indirect fire straight over the heads of the advancing troops. This approach required some special considerations all of its own, as it was even

more imperative that the weapon did not suffer from malfunctions or poor set-up, otherwise rounds could fall short directly into the friendly forces. The weapon had to be set on firm ground that would not sink as a result of the vibrations created when firing; it was recommended that the team fire test bursts if possible before the action, to assess the quality of the ground. All barrels needed to be in especially good condition, with fewer than 5,000 rounds fired through them, and all ammunition had to be properly stored and kept free from damp or extreme cold. A very specific instruction was that the coolant in the Maxim's water jacket did not reach boiling point during firing, and should be replaced after the first 500 rounds and after every subsequent 250 rounds. This instruction naturally did not apply to the air-cooled SG-43, but the gunner would still need to keep barrel overheating very much under control, to prevent heat-generated barrel distortions that could result in rounds going astray.

DShK infantry support fire and DP assault

In this scene, the gunner and assistant gunner of a DShK HMG lay down fire on positions in a German-occupied village in the northern Caucasus, providing the cover to enable a rifle squad to move forward into the assault. The DShK was not the fastest-firing machine gun – it had a cyclical rate of c.600rd/min – and certainly not compared to blistering German machine guns such as the MG 42, which fired at 1,200rd/min. Yet the 12.7×108mm round was capable of smashing through almost all common structures with relative ease, and over ranges of more than 2,000m, so it had far greater effects per bullet on target than the German machine guns. The DShK shown here is fitted to an M1931 'Universal' mount, without the large and heavy front shield, but it would also be used in conjunction with the Kolesnikov mount; both could be configured for ground fire or anti-aircraft fire. Two other men are sprinting forward – a DP machine-gunner and assistant machine-gunner, the latter armed with a PPSH-41 submachine gun for close-range protection. Tactically, the DP machine-gunner is making an initial advance to a position where he can emplace his weapon and then put down his own support fire to aid the advance of the rifle squad. With only a 47-round magazine on his weapon (quickly depleted in combat), the DP machine-gunner relies upon the assistant machine-gunner to carry three pre-loaded magazines in an ammunition bag.





This fascinating image shows an infantry squad performing a river crossing with a Goryunov SG-43. In manual instructions for boarding assault craft, it was advised that the observer and ammunition carriers board the boat first, and put down the ammunition cans (to act as ballast), then the gunner and the assistant gunner board and set up the weapon ready for firing at the front of the boat. (From the fonds of the RGAKFD in Krasnogorsk via Stavka)

Ideally, together the MMG squad would know and have targeted key enemy positions in advance, adjusting the traverse and elevation mechanisms of the mounts to put rounds straight down on target. This was particularly important if the firing was to be conducted at night or if the attack was to be launched behind a smokescreen, thus depriving the machine-gun crew of visual references.

During the attack, the MMG squad would lay down drumming fire, replenishing ammunition as needed from the company ammunition store or from its own resources – ready ammunition was stored in niches cut into the walls of the fighting position or in a separate covered position. As soon as the attack appeared to be succeeding, the squad would quickly lift the MMG and move forward across the conquered ground, establishing themselves in the captured positions, ready to repel counter-attacks and also to put down long-range fire on the retreating enemy, to maximize attrition and interfere with efforts to coordinate a response.

The MMG in the defence

In defensive applications, the MMG squad's duties were, quite naturally, to inflict attrition upon an attacking enemy at ranges beyond those of the rifles and LMGs, although as we have seen this tactic was frequently changed to apply to short-range ambushes. We have already discussed the considerations of machine-gun positioning, including the use of alternate positions and the applications of the 'roving' MMG squad, acting on its own initiative. The November 1942 combat regulations make it clear that weight of fire was decisive in a defensive action, advocating that the section increase its fire to 'maximum rate', in the belief that 'a faultlessly operated machine gun cannot be approached by enemy infantry' (Sharp 1998: 36). This perspective is somewhat optimistic, however, because even a well-maintained machine gun would suffer inevitable stoppages, as the manuals copiously list. Those for the M1910/30 – one of history's more reliable firearms workhorses – include misfeeds caused by faulty or damaged belts or misaligned cartridges; rounds jamming in the chamber, causing a failure to extract; problems with failing to chamber properly, often because of weak tension in the recoil spring; misfires caused by bad primers (impossible to spot or plan for), dirt in the mechanism or broken/damaged firing pins; the lock stopping in the middle position, caused by a break in the spring at the fulcrum; and a 'runaway' machine gun, the fault of a worn cocking-lever rest or trigger part. Add to these intermittent problems the natural pauses caused by operating the weapon – ammunition-belt changes, barrel changes, ammunition resupply, coping with crew injuries or deaths, etc. – and the breaks in firing could be frequent and occasionally prolonged. There was also the issue of liquid supply for the Maxim's water jacket, many gallons of which might be required to keep the barrel heat under control during a long action. Finding such volumes of liquid could be problematic in battle, especially as evaporation of the liquid increased with the volume of fire. In extreme circumstances, liquids used in water jackets could include cold beverages and urine.



Soviet machine-gunners killed on the banks of the Dnieper River, Ukraine, likely by artillery fire. The machine gun is a Degtyaryov DS-39. As production of the DS-39 ceased in June 1941,

with limited numbers having been manufactured, historical photos showing its use in combat settings are relatively rare. Note how this one has been fitted with a defensive shield. (De Agostini Picture Library/Getty Images)

How to prevent the enemy targeting of the MMG squad is a recurrent concern of the November 1942 combat regulations. Soviet machine-gun crews were not only targets for general return fire from enemy riflemen, machine-gunners and mortars, they were also the No. 1 target for German snipers. Solutions are proposed in the regulations. One is that the squad leader needs to identify, and have prepared, at least three alternate positions for the machine gun, connected by communications trenches. Should the machine gun start to attract unhealthy levels of return fire, the squad leader can order the rapid relocation of the weapon and the crew to one of the other positions. In the context of a broader defensive line, the regimental commander might also designate one MMG squad as a roving machine gun, its status purposely designed to confuse the enemy as to the location of other machine guns. As with the standard section policy, the roving MMG squad established 3–5 alternate and connected positions, the communication trenches well-hidden from enemy view. All these positions, however, were set well away from the main machine-gun firing positions. In battle, the roving MMG squad moved constantly between the positions, firing from each for no more than 5–10 minutes before shifting position. Given the weight and awkwardness of the Maxim, it was doubtless expected that the roving MMG squad be physically fit. All this being said, the official advice also recognized that in extreme circumstances, and particularly in cases of desperate defence, the machine-gun crew might simply have to go for it and deliver the most ferocious and sustained firepower possible.



A striking image illustrating the vulnerability of machine-gun crews – three crewmen lie dead next to their Maxim in the citadel of Brest-Litovsk, besieged and captured by the Germans in 1941. Once a machine-gun position had been identified by the enemy, it would attract concentrated return fire. (Photo12/Universal Images Group via Getty Images)

The MMG in wooded and urban terrain

Both the April 1941 machine-gun squad manual and the November 1942 combat regulations make further points about supporting operations in wooded and urban environments. In urban combat, the main role of the MMG was basically to smash through enemy cover and to create crossfire kill zones across key areas, such as crossroads, main streets, open squares, etc. The 7.62mm, and especially the 12.7mm, machine-gun rounds could easily eat their way through most urban structures apart from structural steel. Even DPs could punch through a single-stack brick wall with two or three rounds, while a DShK could inflict serious structural damage on a building with a long burst of fire. What was critical was that the team selected an intelligent firing position within the urban landscape. Recommended positions were behind solid stone walls, inside houses – firing through windows, doors and loop-holed walls – from around street corners, and any other positions that offered cover and concealment with decent arcs of fire.

In wooded environments, the MMG squad was advised not to establish a fighting position on the outskirts of the wooded area, as any treeline would be a natural target for enemy mortars, artillery and tank fire. Instead, the squad was advised to set itself deeper inside the forest, with the arc of firing covering any clearings and roads plus the edge of the forest and its approaches. The critical consideration for the squad was that because of the reduced visibility created by the surrounding forest, they should keep constant compass orientations and not allow themselves to be separated from infantry support. They were also advised to keep submachine guns and grenades at the ready, to defend against sudden close-quarters assaults from enemy infantry.

MOUNTS AND MOBILITY

The Soviet machine guns of World War II were no lightweights. The lightest of the bunch, the DP, still weighed in at 11.5kg, which necessitated substantial upper-body strength for a single individual to carry. When we arrive at the MMGs and HMGs, however, the scales really start to tilt. The M1910/30 (gun only) weighed nearly 18kg *without* the water jacket filled; with the water jacket topped up and including the mount the total gun system weighed 66kg. The DShK, meanwhile, came in at an arm-breaking 34kg on its own. The SG-43 weighed 13.8kg (gun only) but 41kg with its Degtyaryov mount. Given that the Soviet MMGs and HMGs were substantial crew-served weapons, much of the capability of these systems depended upon the efficient transportation of the weapons to the points of decision and the equally efficient weapon set-up in a fighting position.

The most popular of the wheeled mounts, applied principally to the M1910/30, was the Sokolov. This was a two-wheeled system pulled via a U-shaped tail. The first iterations of the Sokolov, dating back to World War I, had folding legs integrated, designed to raise the machine gun off the ground for more stable firing, but these were later omitted as unnecessary and adding to the weight. The Sokolov enabled the machine-gunner to traverse and elevate the weapon, but without precision adjustment. It came with a protective shield behind which two men could hunker down, observing their fire through a viewing port, but the shield could and often was removed, generally to save weight but also because it could limit the team's view of the battlefield in front of them.

The Sokolov was an unimaginative mount, heavy to manoeuvre but of virtually indestructible build quality. It was an infantry mount, however. For anti-aircraft adaptation of the Maxim, the Soviets introduced a new M1928 tripod,

designed by Mikhail Nikolaevich Kondakov, along with the M1929 anti-aircraft sight. The problem with the new tripod was that it added another piece of kit for the infantry or cavalry to take into action, thus it was typically issued to only one of the platoons in a machine-gun company. A different solution came with a simple anti-aircraft adaptation of the Sokolov mount, which featured a long vertical bar attached to the centre of the mount, raising the machine gun to the height of a standing operator and essentially creating a mobile pintle mount.



A PM M1910/30 gunner and assistant gunner demonstrate the correct method of manual lifting of the weapon on the Sokolov mount. Sometimes a third man would assist by supporting the pull handle, which would allow the other men each a free hand each to carry an ammunition box apiece. (Courtesy of the Central Museum of the Armed Forces, Moscow via Stavka)

An alternative wheeled mount system was that designed by Degtyaryov and used particularly for the SG-43 and DShK when in ground-firing mode, but also with the M1910/30. Again, it was of a two-wheeled type with a detachable shield, but instead of the U-shaped pulling bar it had a single straight bar, with draw handles at the end. When the machine gun was emplaced, the machine-gunner sat on a small seat that straddled both of the arms.

During the pre-war years, the Soviets continued to explore options for improving the mounting systems for machine guns. The two designers who achieved this were Ivan Nikolaevich Kolesnikov and Semyon Vladimirovich Vladimirov. Kolesnikov designed another wheeled mount, but with a single pole drawbar featuring a machine-gunner's seat and elbow rests. It was lighter and simpler to use. An even better mount was the M1931 'Universal' designed by Vladimirov, which became one of the most popular types for use with the

DShK. It had tripod arms that folded together when drawn or deployed in infantry use, and folded out (with the wheels and the optional gun shield removed) to elevate the machine gun into its anti-aircraft configuration. Nikolai Fedorovich Tokarev, meanwhile, designed the quad mount for the Maxim, for use both at fixed installations or fitted to the back of trucks or trains.

A machine-gun mount was designed for manoeuvring and establishing a machine gun in a firing position. Transporting that machine gun for some distance on the march was another matter altogether, however, and was made possible through a mixture of traditional transport and stolid Soviet innovation. While machine guns were of course carried within motorized vehicles, literal horse power was still central to Soviet logistics during World War II. There were two basic equine tools for pulling machine guns and their kit: the four-wheeled *tachanka* carriage, which could hold one or two machine guns and all their associated kit and was pulled by two horses; and the *dvukolka* two-wheeled cart, used to carry a single MMG or HMG. In snowy conditions, wheeled carts were often swapped for skis and sledges, which were also used by troops to pull machine guns by hand or behind stocky ponies.

The means of transportation of machine guns reflected a time in which these weapons, as robust as they were, were vulnerable to the knocks, bumps and exposure of the road. The April 1941 machine-gun squad manual enjoins the crew to monitor the condition of the weapons frequently during periods of transit, checking particularly that more vulnerable moving parts and delicate instruments (such as optical sights) are not being knocked and damaged or, in winter, parts are not being frozen on the move.



A sled-mounted M1910 is dragged through winter snows by a Red Army machine-gun team. The draw arm of the Sokolov mount has been placed forward so that the rear

man can use the receiver as a push surface to facilitate movement. (Courtesy of the Central Museum of the Armed Forces, Moscow via Stavka)

The MMG versus armour

In terms of anti-tank projectile weapons (as opposed to emplaced weapons, such as mines), Soviet tanks faced three main threats: the firepower of enemy armour, anti-tank guns and infantry-launched missiles (such as the *Panzerfaust*). Countering the first on this list was overwhelmingly the responsibility of Soviet tanks, tank-destroyers and anti-tank guns, on account of the fact that German armoured hulls and turrets could largely shrug off the impacts of even HMG rounds. The November 1942 combat regulations clearly acknowledge this fact, at one point stating that if an enemy tank approaches the machine gun's position, the unit's best line of response is to store the machine gun on the floor of their fighting position and tackle the tank with anti-tank grenades, 'ball charges' (a bundle of grenades wrapped around a common fuse) and incendiary bottles.

This was not to say that the HMGs and even MMGs should never engage enemy tanks, however. First, they had the range to do so. Post-war studies of engagements on the Western Front found that the average opening range for combat in armour-vs-armour battles was about 600m, with less than 2 per cent of clashes taking place at the maximum range of the guns (about 1,800m) and 22 per cent occurring between 185m and 365m. Allowing for a slight range extension on the Eastern Front, which often saw battles fought over more open terrain than in Western Europe and the Mediterranean theatre, this still meant that if an MMG or HMG squad could position itself relatively close to the Red Army tanks, the enemy armour would be well within engagement range. The M1910/30, for example, had an effective range of 1,000m, the SG-43 1,100m and the DShK could reach out to 2,500m.

In most cases, indeed the majority, the best use of this range was to hit concentrations of enemy infantry moving *behind* the tanks. With armour-piercing rounds the Soviet machine guns could inflict some damage on critical areas of the vehicle; the July 1941 *Handbook for the Commander and Soldier of the Machine Gun Squad* states that by using specialist ammunition the machine gun could target and damage the engine, fuel tank, crew compartment or radiator grille; other significant points of impact could be vision blocks, commanders standing up in open hatches, communications

equipment, and even lucky passes through vision slits. If the enemy armour was of lighter variety – e.g. half-tracks and light armoured cars – the machine guns could potentially wreak more serious penetrative damage. The 12.7×108mm B-30 armour-piercing bullet fired from the DShK could penetrate 16mm of armour; the maximum armour depth of an SdKfz 251 half-track was 14.5mm. So, in general the machine-gun crews were not advised to engage heavy enemy armoured vehicles – but this is not to say that they never did so with purpose.



Soviet partisans receiving instruction in the use of the Degtyaryov DS-39. The DS-39 was not a reliable weapon, and second-rate Red Army weaponry often migrated out to partisan

operators. (Sovfoto/Universal Images Group via Getty Images)

MACHINE GUNS AS AUXILIARY TANK ARMAMENT

In Soviet tanks, the DT was the principal machine gun, either ball-mounted in the hull or set atop the turret for light anti-aircraft use; some heavier AFVs, such as the IS-2 heavy tank, later acquired the DShK and DShKM as their anti-aircraft machine gun. Aside from their air-defence function, the machine guns were used to engage enemy infantry, provide support fire for friendly infantry and – by using tracer – mark targets for the tank's main gun.

The machine guns of armoured vehicles could by themselves put out volumes of fire significant enough to cause German ground troops serious problems. Such is evident in the following incident, in which a disabled Russian KV-2 heavy assault tank, armed with three or four DT machine guns as well as the 152mm main gun, established itself as a blocking position across a German supply route in southern Lithuania in late June 1941. The disabled tank shrugged off multiple anti-tank shell strikes, survived combat-engineer demolition attacks and destroyed several German anti-tank guns. After each German assault, the tank's machine guns kicked into life, both inflicting casualties and preventing the Germans from evacuating casualties in the open:

It was about 0100 before the engineers could finally get to work. They attached one explosive charge to the track and the side of the tank and withdrew after lighting the fuse. A violent explosion ripped the air. The last echoes of the roar had hardly faded away when the tank's machineguns began to sweep the area with fire. The tank did not move. Its tracks appeared to be damaged, but no close examination could be made in the face of the intense machinegun fire. Doubtful of success, the engineer detachment returned to the bridgehead and made its report. One of the twelve men was listed as missing.

Shortly before daylight a second explosion was heard from the vicinity of the tank, again followed by the sound of machinegun fire; then, after some time had passed, silence reigned once more. (Department of the Army 1953: 81)

A German combat engineer involved in these attacks, found wandering bootless around German positions, further explained his own experience of this obdurate opponent:

I was detailed as an observer for the detachment that was sent to blow up the Russian tank. After all preparations had been made, the company commander and I attached a charge of about double the normal size to the tank track, and I returned to the ditch which was my observation post. The ditch was deep enough to offer protection against splinters, and I waited there to observe the effect of the explosion. The tank, however, covered the area with sporadic machinegun fire following the explosion. After about an hour, when everything had quieted down, I crept to the tank and examined the place where I had attached the charge. Hardly half of the track was destroyed, and I could find no other damage to the tank. I returned to the assembly point only to find that the detachment had departed. While looking for my boots I found that another demolition charge had been left behind. I took it, returned to the tank, climbed onto it, and fastened the charge to the gun barrel in the hope of destroying at least that part of the tank, the charge not being large enough to do any greater damage. I crept under the tank and detonated the charge. The tank immediately covered the edge of the forest with machinegun fire which did not cease until dawn, when I was finally able to crawl out from under the tank. When I inspected the effect of the demolition, I saw, to my regret, that the charge I had used was too weak. The gun was only slightly damaged. Upon returning to the assembly point, I found a pair of boots, which I tried to put on, but they were too small. Someone had apparently taken my boots by mistake. That is why I returned barefoot and late to my company. (Department of the Army 1953: 81–82)

Eventually, after an astonishing 48 hours of resistance, the KV-2 was destroyed when a heavy 8.8cm flak unit was brought up to deal with the vehicle. The significant volumes of machine-gun fire generated were, given the numbers of DTs on board, equivalent to that of the automatic fire of 3–4 rifle squads, which goes a long way to explaining the KV-2's prolonged survival (the other part of the explanation was the failure of German 5cm anti-tank guns to penetrate the heavy armour).



While many IS-2 heavy tanks were fitted with the 12.5×108mm DShKM HMG for turret-mounted anti-aircraft defence, this example has the far less powerful 7.62×54mmR DT (two more DTs were fitted in coaxial and ball-mount arrangements). Note how the turret-mounted DShKM is configured for infantry dismounted use, with the bipod already fitted. (From the fonds of the RGAKFD in Krasnogorsk via Stavka)

Another fascinating personal account of the use of Soviet machine guns from armoured vehicles, albeit one with a very different inflection, comes from Dmitry Fedorovich Loza, a Ukrainian colonel and Hero of the Soviet Union, who served as an armour officer during World War II. In his memoir *Fighting for the Soviet Motherland*, Loza angrily recounts his experiences within the 233rd Tank Brigade, sent into battle on 17–18 September 1943 on the banks of the Desna River (a tributary of the Dnieper) in Matilda II infantry support tanks, more than 1,000 of which had been sent to the Soviet Union by the British. The Matilda II proved to be a poor performer in the forested and swampy terrain that characterized much of the Eastern Front, and by this stage of the war it was largely obsolete.

Loza's unit became bogged down, both literally and tactically, in fighting around the village of Gobika on 18 September, with one of the Matilda IIs

stuck fast in marshland. The unit took up defensive positions and waited until nightfall to attempt to retrieve the vehicle with a towing cable. During the recovery operation, however, the night was suddenly split by a long burst of machine-gun fire, from one of the Soviet tank crews using a dismounted machine gun. Here we begin to see a different angle to the Soviet machine-gun story. During the recovery operation, the platoon commander, one Senior Lieutenant Orlov, had ordered his crew to dismount the tank's machine gun to provide security for the recovery operation. Of note, however, was that this was not a DT, but rather a British Bren gun, which was turret-mounted on the Matilda II for air defence. The Bren gun was fitted with a 100-round drum magazine, several of which were stored inside the tank. The 100-round drum of .303 ammunition was developed by the British purely for air defence and, in a similar way to the DP's magazine system, it required an additional mounting bracket fitted forward on the receiver. Taller anti-aircraft sights were also installed. Loza noted that when the Bren gun was dismounted from the tank and set on a bipod, it was a capable light machine gun (Loza 1998: 27).

The machine-gunner, Stroynov, having done as he was told, was now stunned to look out over the battlefield and see Orlov running zig-zag across the battlefield with his arms raised, in an effort to surrender to the Germans opposite. Incensed, Stroynov raced to his weapon, dropped prone behind it, pulled the charging handle and squeezed the trigger with the sights on Orlov. The Bren gun didn't fire. For reasons unexplained in Loza's account, the weapon's bolt had not been installed, and was lying on the grass ahead of the Bren gun in the darkness. Eventually Stroynov found the bolt, snapped it back in, and as Orlov was approaching the German lines, he simply let off all 100 rounds in a single uninterrupted burst. All the bullets missed their intended target, however, and Stroynov was left with a no doubt smoking Bren gun.



With the words 'On the road to Moscow 1941' written on the back, this photograph shows German troops inspecting a captured Soviet quad M1910/30 anti-aircraft gun. The mount arrangement was designed by Nikolai Fedorovich Tokarev, with the assistance of Georgi G. Kurenkov, Aleksei I. Panov and Sergei A. Prilutski. Although the quad M1910/30 could put out a ferocious volume of fire at a cyclical rate of 1,800rd/min, the 7.62×54mmR machine-gun round was only effective out to a range of about 1,500m, hence the weapon was best used against low-flying ground-attack aircraft, especially the Junkers Ju 87 Stuka. (Nik Cornish at www.stavka.org.uk)



A triple-mounted DShK stands guard in the centre of Moscow in 1941/42. The traverse of the mount is delivered by the man in the foreground, via a handwheel. To modern eyes, the lack of ear defenders for this DShK crew is alarming, as the noise of just one 'Dushka' firing is horrendous. (Author's Collection)

MACHINE GUNS IN THE ANTI-AIRCRAFT ROLE

As well as serving the armoured forces, Soviet MMGs and HMGs also added a serious weight of fire to air-defence work. All Soviet machine-gunners, even those equipped with the DP, would receive training in anti-aircraft gunnery. Ideally, the machine gun would be suited to the purpose via fitting to a dedicated *zenitnoi ustanovke* (anti-aircraft mount), whether a pintle, tripod or rotating platform. If such mounts were not available, the advice in the July 1941 machine-gun squad manual for the gunner was to prop the weapon at an angle on the parapet of a trench, a stump or post, a vehicle, or any other surface to increase the angle of fire.

The range capabilities of the machine gun in use affected the engagement range/altitude. An M1910/30 and an SG-43 would typically fire on the enemy aircraft at no more than 1,000m; a DShK could reach out to double that, although in reality its crew would also generally stick to the 1,000m

rule, to ensure the most accurate fire and to reduce the likelihood of errors in lead calculation and angles. On firing, the gunner could either opt for short bursts, changing gun position between each burst, or adopt a 'maintained lead' approach by firing a long burst while turning the weapon to maintain the lead at a constant gap. The best time to engage an enemy aircraft was when it was either in a dive or coming out of a dive, as these attack patterns offered predictable lines of flight; it was advised to aim at the nose of a diving aircraft and the tail of an aircraft just coming out of a dive. For aircraft crossing or passing at an angle, the gunner had to calculate the firing lead in terms of aircraft silhouettes in front of the direction of flight. The July 1941 machine-gun squad manual provides a guidance table for this (overleaf) relating to the M1910/30.



A DShK HMG keeps guard of the skies while on anti-aircraft duty. In the anti-aircraft role the DShK was fitted with special high-angle sights, with improved models of the sight issued in 1938, 1941 and 1943. (US Navy Bureau of Ordnance)



This Berezin UBI aircraft gun is pintle-mounted to provide air defence. Although the weapon was fast-firing (up to 1,000rd/min), it was not well-suited to the rapid and continuous fire of air defence, a role much better performed by the DShK. (Keystone-France/Gamma-Rapho via Getty Images)

AIM POINT LEAD IN AIRCRAFT SILHOUETTES			
Distance	Messerschmitt (Bf 109)	Heinkel (He 111)	Junkers (Ju 87)
100m	2	½	1
200m	4	1	1½
300m	6	1½	2
400m	9	2	3
500m	12	3	4
600m	15	4	5½
700m	18	5	6½
800m	22	6	8
900m	26	7	10
1,000m	30	8	12

Anti-aircraft fire – quad PM M1910/30 and SG-43

The quad-mounted arrangement of the PM M1910/30 could send out an astonishing volume of fire, guided by a simple ring sight, which featured two concentric rings to allow the gunner to make basic lead and elevation calculations. Although many such quad machine guns were mounted on fixed installations, the Soviets also fitted them to flatbed trucks to create a mobile firing platform. Here we see one such unit, firing from the back of a GAZ-AA truck at a flight of German Junkers Ju 87D Stukas at Kursk in July 1943. One point to note about the quad-mounted arrangement was that if one of the machine guns malfunctioned while the others kept firing, it was actually very difficult to maintain the point of aim, as the static machine gun affected the recoil harmonics of the whole weapon system. Passing the truck are two men pulling a Goryunov SG-43 on a Degtyaryov mount, heading into the battle. Although the Degtyaryov mount was robust and reliable, it was also heavy, and its wheels could easily sink into soft ground.



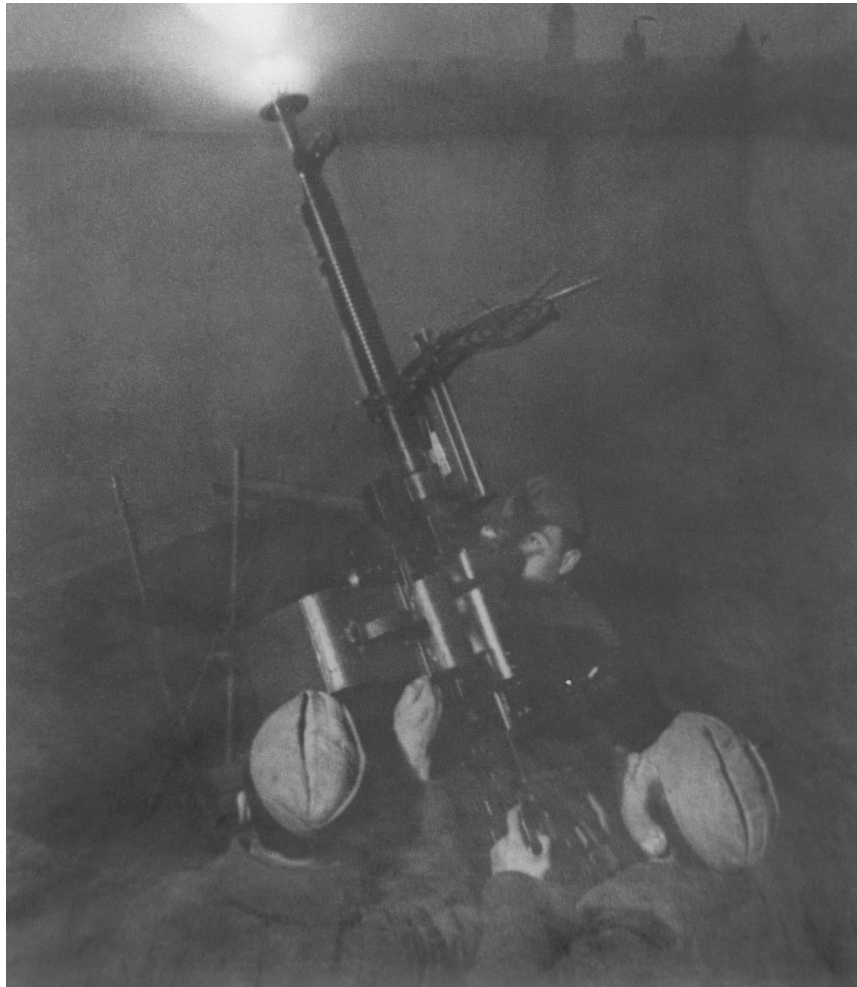
The DShK was also an estimable anti-aircraft weapon in well-trained hands, and it increasingly took over from the quad-mounted M1910/30 as the Red Army's air-defence weapon of choice. At the beginning of the Great Patriotic War in June 1941, air defence was handled by divisional or

independent anti-aircraft battalions, although these were later raised to regimental then divisional anti-aircraft formations, to cope with the extent of the threat. By mid-1942 an anti-aircraft regiment was typically armed with three gun batteries, each with four 37mm cannon; an anti-aircraft machine-gun company of three platoons, each with four quad M1910/30s; and another machine-gun company with two platoons, each with four DShKs (Zaloga & Ness 2009: 126–27). Over time, the DShKs progressively squeezed out many of the quad M1910/30s, especially as a result of the order, issued in November 1942, to form 46 anti-aircraft divisions. The anti-aircraft division of 1942 included 48 quad M1910/30s, 32 DShKs and 48 37mm cannon. The anti-aircraft division of 1944, by contrast, had no quad M1910/30s (on paper at least), 52 DShKs, 72 37mm cannon and 16 85mm anti-aircraft guns. The shift towards power and range in air defence is clear to see.



A Red Army DShK team fires on German bombers in June 1942. Although the DShK was quite capable of firing out to several thousand metres, most combat reports indicate anti-

aircraft kills at just a few hundred metres; distances where fire could be more easily adjusted through observed tracer flight. (Sovfoto/Universal Images Group via Getty Images)



A dramatic photo of a DShK team conducting night-firing against German bombers over Leningrad. The expansive muzzle flash of the DShK could cause the machine-gun crew problems in low-light conditions, as their night vision was quickly degraded by the intense and repetitive blasts of light, thus a separate observer often called adjustments to fire. (TASS via Getty Images)

To give a sense how serious even a single a DShK could be in the air-defence role, we take just one incident out of the eventful life of German Junkers Ju 87 Stuka dive-bomber pilot, Oberst Hans-Ulrich Rudel, one of Germany's most decorated warriors. On the Eastern Front he flew 2,350 ground-attack sorties, and Soviet HMG anti-aircraft fire was a perennial danger. On one occasion in the battle of Hungary in 1945, his flight of Stukas attacked several IS heavy tanks, each of which was equipped with a DShK on the turret for air defence, as well as three DTs around the hull and turret.

Rudel flew down to observe one disabled IS tank and spotted some of the crew crouching behind a DShK, not on the turret but dismounted next to the tank on a tripod. Rudel was close enough to observe muzzle flashes coming from the barrel of the weapon, but felt that even though he was at 50–60m range, the arc he was flying would make him too difficult for the machine-gunner to hit. Moments later, he was hit and severely injured by two 12.7mm rounds, causing him to make an emergency diversion to Budapest, where a surgeon managed to save his life.

IMPACT

The transformation of Soviet firepower

A point I make frequently when writing about firearms is that it is quite difficult to assess the overall impact that individual small-arms systems have on the outcomes of battles, campaigns and even entire conflicts. Firearms are intrinsically personal weapons, their constraints and opportunities defined to a large degree by the personal ability and courage of the individual handling them. There are, however, key junctures in the history of firearms, when a new type of firearm breaks the continuities of the past and begins the process of rendering other weapons obsolete. Prime historical examples are the first flintlocks, the Dreyse needle gun, the Maxim machine gun, the M1 Garand rifle and the AK-47 assault rifle.



A DP team provides covering fire during a counter-attack in the Muzdok region, northern Caucasus, September 1942. The machine-gunner follows the recommended positioning of his left hand around the underside of the stock, a grip that gave more precise control over the movement of the weapon. (Universal History Archive/UiG via Getty Images)

OBSOLESCENCE AND INNOVATION

An evaluation of Soviet machine guns, however, is somewhat more complicated. The types that we have explored in this book were fine firearms in their own classes, but it would be hard to argue that they were revolutionary or exceptional. In fact, if we were to compare them to the German developments in machine-gun technology, then we see that they

lagged behind in several important respects. During the 1930s the Germans invested in the concept of the *Einheitsmaschinengewehr* (universal machine gun), or what we today refer to as the general-purpose machine gun (GPMG), a single weapon platform that can be repurposed for LMG, MMG and even HMG roles via changes in the mounts and the sights. The two defining German GMPGs that emerged – the MG 34 and MG 42 – were superb type-leading weapons, ones that gave exceptional firepower capability to German forces. The MG 42, for example, could put down 7.92×57mm bullets at an astonishing cyclical rate of 1,200rd/min, and was applied across a flexible multitude of tactical roles, such as an assault LMG from its bipod, a company-level MMG from a tripod, or as a fortress defence weapon or anti-aircraft gun on a pintle mount. It was light enough to be portable (being air-cooled meant no bulky and heavy water jacket), but heavy enough to put down sustained fire, aided by the ultra-quick-change barrel systems. Both the MG 34 and MG 42 could be served properly by two men, not a larger squad or section.



A Red Army M1910/30 team begin the hard effort of moving their machine gun and its ammunition forward during an attack. There were front-line complaints that the weight of the Maxim and its mount meant that machine-gun squads often failed to keep up with the pace of advance. (Courtesy of the Central Museum of the Armed Forces, Moscow via Stavka)

The Soviets would not approach the GPMG concept convincingly until after World War II. The M1910/30 was resolutely an MMG, on account of its weight, bulk, crew requirements and fire characteristics. (We might remember that the Germans had attempted a problematic LMG conversion of the Maxim machine gun, the MG 08/15, during World War I, but at 18kg in

weight it was never fit for purpose.) The DP was an LMG and the DShK was an HMG – they could be nothing else. The SG-43 came potentially closer to the GPMG concept, but its bulk meant it never approached the portability of the German weapons. In fact, the closest that the Soviets came to a proper GPMG concept was, arguably, the DS-39, and maybe some of the air-cooled aircraft machine guns, if they had been repurposed.

Focusing a little more on the impact of specific types, while Maxims remained a fundamental part of Soviet machine-gun firepower throughout the war, their age, performance and physical awkwardness was already starting to tell against them. In fact, we can argue that the Maxim actually held the Red Army back in some key regards. Maxims were tough machine guns, but their water jackets were very vulnerable to battle damage; a punctured water jacket would quickly lead to an overheating barrel if the leak was not repaired quickly. The Maxim's weight was also a big problem for an army progressively embracing an offensive mindset. A Ukrainian Front report in the later years of the war noted that the Maxim was appreciated for its reliability, stability and firepower characteristics, but its heavy weight rendered it tactically limited, Maxim crews being compelled to move more slowly than their parent units, meaning they were unable to offer fire support in the offence (Bolotin 1995: 164). The report writer further stated that any machine gun with a total system weight of more than 40kg actually represented a 'burden' in offensive actions and a restriction on manoeuvre warfare. There does seem to have been a need for the Maxim's wholesale replacement by if not a GPMG, then at least an air-cooled MMG – the rise of the SG-43 from 1943 showed that the days of the water-cooled machine gun were truly numbered.

So as hard-working as Soviet machine-gun designers were during the 1930s and the war years, it is challenging to argue that their weapons had superior battlefield impact on account of technological ingenuity, especially as the archaic Maxim still formed the heart of the firepower – but was such ingenuity actually important? Between them, the Degtyaryov machine guns, M1910/30, SG-43 and DShK covered all the major tactical requirements of the Red Army, even if they split those tactical roles between different machine guns. Where we really start to see the impact of the Soviet machine guns, however, is when we factor in production figures.



These Belorussian partisans have a dismounted DT machine gun to deliver their light support fire. The biggest issue with this weapon was the same as with the DP, namely that the position of the recoil spring directly beneath the barrel caused the spring to lose temper due to barrel heat. (Sovfoto/Universal Images Group via Getty Images)

BOLSTERING RED ARMY FIREPOWER

Between 1939 and 1945, Germany and its occupied territories produced 674,280 machine guns for the Wehrmacht's war effort. The Soviet Union, by contrast, manufactured 1,477,400 machine guns. We have to be careful with such big numbers, however, as the Soviet Union's ground forces were significantly larger in terms of personnel than the German Wehrmacht (although far from limitless as some popular notions suggest), hence those weapons that were produced were spread across a broader pool of

personnel. Yet it is still clear that the Red Army generated an enormous volume of firepower by focusing on a handful of types and producing them in substantial numbers. This approach was helped particularly by the fact that the M1910/30 was already a well-established weapon in Soviet manufacturing well before World War II, and also by the way that Degtyaryov designed a suite of weapons with much in common regarding mechanical operation, thus aiding production. Many of the modifications to Degtyaryov machine guns came towards the end of the war when the existential threat to the Soviet Union had been alleviated. The focus on discrete types rather than attempting a GPMG principle could also conceivably reflect the centralized command mindset of the Red Army, which focused on assigning individuals specific tasks rather than devolving battlefield initiative down to the lower levels of leadership.

Given that ‘quantity has a quality of its own’ (a phrase uncertainly attributed to Stalin), the greatest impact achieved by the Soviet machine guns we have studied in this book was that they were present in great numbers. Machine guns were prolific in the Red Army, not just in infantry, tanks and air defence. Each of the three infantry battalions in motorized regiments, for example, had its own anti-aircraft machine-gun companies and the regiment itself also had its own organic anti-aircraft machine-gun company. A Soviet cavalry regiment from January 1942 had an anti-aircraft platoon with three DShKs, four mounted squadrons each with two DPs and an entire machine-gun squadron of four machine-gun platoons, each with four MMGs (usually the M1910/30), the cavalry units moving the weapons around the battlefield on their horse-drawn *tachanka* carriages. Each company in an armoured reconnaissance regiment included a machine-gun platoon, which together with the LMGs of the three rifle platoons meant that a company had nine LMGs and four MMGs to draw upon. A ski brigade of late 1942 had three battalions, each of its three rifle companies including three DPs (one for each of three rifle squads), plus a machine-gun platoon of three squads, each with an M1910/30 or SG-43; some ski brigades would also include an anti-aircraft machine-gun platoon with three DShKs.



In this dramatic image, Red Army cavalry go on the charge with a Maxim team supporting them straight from the back of their *tachanka* carriage. From February 1943, each of a cavalry regiment's four mounted squadrons would have a machine-gun platoon, each platoon armed with four MMGs. (Sovfoto/Universal Images Group via Getty Images)

So, as we can see, machine guns were always core components of most Red Army units. What is crucial, however, is the way in which the levels of distribution of Soviet machine guns changed over the course of the war, particularly in relation to the manpower of the unit. This is most visible when we look at the aggregate distribution of machine guns in the Soviet rifle division (at least as defined by the TO&Es) between September 1939 and the end of the war. In September 1939, the total complement of machine guns in a rifle division was 773 weapons of all types. Almost all of these weapons were distributed within the rifle division's three rifle regiments (there were single-digit numbers of HMGs in the light artillery regiment and medium artillery regiment), in turn within the rifle companies and their machine-gun platoons, plus the machine-gun company and anti-aircraft company.

PERSONNEL AND MACHINE GUNS IN THE RED ARMY RIFLE DIVISION, 1941–45						
Date	Personnel	LMGs	MMGs	Quad AA	HMGs	Total
September 1939	18,841	578	162	15	18	773
April 1941	14,483	392	166	15	18	591
July 1941	10,859	162	108	18	9	297
December 1941	11,626	251	108	0	12	371
March 1942	12,725	352	114	0	9	475
July 1942	10,386	337	112	0	9	458
December 1942	9,435	494	111	0	9	614
July 1943	9,380	494	111	0	0	605
December 1944	11,706	337	166	0	18	521
June 1945	11,780	383	158	0	18	559

These figures show some distinct patterns, not least a precipitous collapse in the volumes of divisional machine guns fielded between the years 1939 and the end of 1941 – the latter an appallingly destructive year for the Red Army. Then comes an uptick and climbing trajectory in automatic firepower from mid-1942 until roughly the end of the war, although it seems they never quite reach the figures just prior to the onset of Operation *Barbarossa*. Considering divisional personnel figures, however, significantly changes the equation. The table above shows the quite profound divisional manpower reductions that took place between 1939 and 1943, only recovering partially in the last two years of the war. When we take these figures and cross-reference them against the numbers of machine guns, it is clear that a different divisional model was emerging, one with fewer personnel but comparatively more firepower. Making a crude calculation, in April 1941 there was one machine gun for every 24.5 personnel in the rifle division. By July 1943, however, there was a machine gun for every 15.5 personnel. In this context, we should also note the extraordinary growth in the number of Red Army rifle divisions (including mountain divisions and motorized divisions) during the war, from 198 in June 1941 to 517 in May 1945. This means that in June 1941 the Red Army infantry was putting just over 100,000 machine guns onto the battlefield; by May 1945, the figure was nearly 300,000.

We can make some qualifying and clarifying observations about the figures above. Following the Red Army's calamitous performance in the opening

weeks of Operation *Barbarossa*, Stalin was compelled to create and field new rifle divisions fast. To do so, the fresh rifle divisions were of significantly reduced size, with a 25 per cent reduction in personnel. The drop in allocation of machine guns was actually proportionately greater – 49 per cent – both through losses of materiel on the battlefield and through the fact that much of Soviet industry was compelled to stop production and migrate east. During this time, rifle platoon LMGs were reduced from four to two and the MMG company was removed from the regiment. It was a time in which the Red Army clung onto the war by its fingernails.

The recovery of machine-gun strength and capabilities began in December 1941, when new TO&Es introduced three more LMGs back into the rifle company; but it was 1942 that saw the new model of the Red Army begin to change the game. Confining our attention to the machine guns, in May 1942 we see a rifle company with 12 LMGs (one for each rifle squad), although MMG teams saw a personnel reduction of two men from each squad in the machine-gun company. In the significant December 1942 TO&Es, however, the number of DPs in each rifle company was increased by the introduction of the two-gun heavy squads (described previously). Zaloga & Ness note that although regimental personnel numbers were reduced to 2,474 from the previous 2,517, at the same time the automatic-fire capability was increased from 108 LMGs and 27 MMGs to 162 LMGs and 36 MMGs. They also point out that the December 1942 TO&Es saw the anti-aircraft battery and machine-gun battalion dropped from the rifle division, accounting for this by the reduced presence of the Luftwaffe on the Eastern Front and the increasing focus on offensive operations rather than defensive ones (Zaloga & Ness 2009: 27–28).

From late 1942, therefore, the total volume of automatic weapons climbed prodigiously in Soviet forces, and went into smaller, but more numerous, units and formations. Here was a Red Army reconfiguring itself for offensive manoeuvre warfare. Although Soviet tactics would frequently remain somewhat crude and bludgeoning, the amateurish days of 1941 were slowly disappearing and instead came an army looking to recover ground and surge on into Germany itself. It is notable from the figures in the table above how the volume of LMGs shows the most significant rise, as the Soviet regime became more offensively minded. Another interesting point is the increasing numbers of DShKs, at the expense of the quad Maxims. The DShK had far greater power, penetration and long-range reach than the M1910/30, and was

more versatile in terms of the platforms to which it could be attached (not least armoured vehicles).



Soviet partisans utilized captured weapons as much as those provided by the regime. The machine-gunner in the background has a German Maxim MG 08/15, which although approaching obsolescence still served in the German Army in World War II as an HMG. (© Hulton-Deutsch Collection/CORBIS/Corbis via Getty Images)

Despite the flaws of the Maxim, what we can certainly say is that as the war progressed the Axis forces would have experienced an exponentially increasing weight of machine-gun firepower ranged against them, with all the consequences that this entailed – increased casualties across a longer spectrum of ranges; greater difficulties in securing a manoeuvre advantage; heavier losses of men and materiel. For the Red Army, the escalating distribution of machine guns represented a shift in military culture. Manpower could only take the Red Army so far and throwing masses of men against enemy lines would never bring victory. Only the combination of manpower with firepower could achieve that hard-won goal.

BATTLEFIELD PERFORMANCE

There is certainly no doubt that the Soviet infantry machine guns played a decisive role in ground engagements. During March–April 1944, for example, Guards Sergeant Aleksandr Zhezherya, a Maxim machine-gunner, was in constant action along the Yuzhnyi Bug River, in both offensive and defensive actions. Despite being wounded three times, it was recorded that he killed 343 Germans and repulsed 22 enemy counter-attacks with his M1910/30. Although he would not survive the war, Zhezherya was granted

the title Hero of the Soviet Union and his Maxim went into the Central Museum of the Armed Forces in Moscow (Bolotin 1995: 166).



Red Army *aerosani* (aerosleds) were basically propeller-driven snowmobiles, used for mobile light reconnaissance and raiding during the snow-covered months. Each sled is armed with a DT machine gun in a light armoured shield, the weapons in their infantry sight configuration. (Photo by Sovfoto/Universal Images Group via Getty Images)

Facing Soviet machine guns used in the attack

An account of how effective Soviet LMGs could be in the assault role comes from the US Army publication *Small Unit Actions During the German Campaign in Russia*. Published in 1953, the manual was compiled from interviews with German combat veterans and written under the direct supervision of Generaloberst Franz Halder, Chief of the German Army General Staff. Their accounts, while treated with due caution by the US compilers and editors, provide an insight into what it was like to be on the receiving end of Soviet machine-gun fire.

One narrative describes a Red Army assault on the town of Khristishche on the Donets River in January 1942, in arctic conditions of -40° , the town occupied by the German I. Bataillon, Infanterie-Regiment 196. The first significant attack came at 2115hrs on 24 January, when Soviet ski assault troops attempted a night attack after a day of sporadic bombardment. The attack was beaten back, but only after the Germans managed to get one of their own machine guns into play, a weapon that had been stored inside a building as opposed to those outside, which had all frozen solid. The following morning, two Soviet reconnaissance patrols of about 30 men each, supported by three DPs and 20 snipers, made another foray against the edge of the town, which was again repulsed by small-arms fire. The Germans reported that between attacks, automatic-weapons fire was heard within the

Soviet lines as the NKVD executed men for cowardice or similar ‘crimes’. A larger and more ingenious assault on Khristishche came that night, as the report explains:

That night a Russian combat patrol of 50 men under the command of an officer approached Khristishche from the east. The patrol was armed with 8 submachineguns, 2 pistols, 2 signal pistols, 38 automatic rifles, 2 light machineguns, each with 500 rounds of tracer ammunition, and 8 hand grenades per man. Most of the men wore padded winter uniforms and felt boots with leather soles; those, however, who could speak German were dressed in German uniforms. The patrol was to occupy the first houses and then send a message to the rear, where a reinforced company was kept in readiness to follow up the patrol’s attack and to occupy Khristishche. (Department of the Army 1953: 28–29)

Note the statement about the amount of ammunition provided for each of the two machine guns. Assuming that these are DPs, this would mean that each weapon was provided with 10–11 magazines, by this account all with tracer ammunition. The volume of ammunition for each machine gun, which would require carrying by several men, is plausible, as the two LMGs were the principal fire support for the entire action, which might be expected to play out over a sustained period of time. The weighting entirely towards tracer rounds is hard to confirm, however, as typically tracer – which is more expensive and has slightly different flight characteristics from standard ball ammunition – was inserted at intervals in the ball rounds, such as 1 in 4. It could be that the report writer has generalized about the proportions of tracer rounds. Yet as this was a night attack, certainly tracer would be used more heavily if available. Not only would it enable the gunner to see and adjust his POA, but he could also use tracer rounds to mark enemy positions for the other members of the unit, or for support fire observers further back.

The Red Army soldiers approached the enemy lines openly at around 0130hrs, masquerading as German troops returning to their positions. The German sentries naturally issued password challenges, which the German-speaking Russians attempted to evade to buy time, then suddenly threw grenades into the German position to initiate the attack. The report takes up the story:

The Russians tossed hand grenades into the first house just as the men of the German squad which occupied the building ran out the back door without suffering any casualties. Throwing hand grenades and firing carbines and machineguns from the hip, the German infantrymen tried to stop the Russians who closed in from three

sides. The German squad was pushed back to the second house, and the Russians immediately occupied the first one, set up two machineguns, and opened fire on M Company men, who were coming up on the double.

The Russians threw hand grenades and explosives through a window into the second house in order to wipe out the German squad occupying this house. At first this attempt was unsuccessful, but when the house caught fire that German squad was forced to evacuate. It got outside through a damaged wall on the far side of the house. By this time the commander of Company M had taken charge of the situation and had launched a counterthrust with company headquarters personnel, reserve squads, and the squad that had initially occupied the first house. Throwing hand grenades and firing their weapons on the run, the counterattacking Germans drove the Russians from Khristishche within a few minutes. Eight Russian enlisted men and one commissar manned two machineguns in the first house, where they resisted to the last man. (Department of the Army 1953: 29–30)



Like all armies, the Soviet Union's armed forces utilized captured weapons on occasion. Pictured in January 1943, this Red Army NCO is armed with a captured ZB-26, a 7.92mm Czech LMG designated by the Germans the MG 26(t) ('*tschechisch*'; Czech) in recognition of its origins. (Sovfoto/Universal Images Group via Getty Images)

The two DP machine-gunners immediately set about establishing a defensible position from which they could deliver a base of fire for the rest of the unit. Although the Soviet troops are eventually routed, there is the clear sense that the machine-gun teams did exactly what they were intended to do, providing covering fire under which the infantry could retreat, even if that meant staying in position until they were themselves destroyed.

These relatively minor attacks were just the prelude for a three-battalion Red Army attack on Khristishche on the night of 26–27 January, conducted without artillery support and in dreadful weather. Again the report writers are able to give us details of the machine-gun component of the attack, stating that 'Each [Red Army] company had 20 submachineguns, 35 automatic rifles,

10 rifles with telescopic sights, 8 heavy machineguns (drum fed), 5 light mortars, 12 pistols, and 2 signal pistols, as well as a number of rifles with fixed bayonets' (Department of the Army 1953: 32). The reference to HMGs here is almost certainly incorrect, at least from our perspective, if only for the fact that it does not mention LMGs at all, even though they would still be critical for the assault, but also because it is likely referring to MMGs. Based on the TO&E of December 1941 (*Shtat* 04/750), each rifle battalion would include three rifle companies, each containing three LMGs, plus a machine-gun company of three platoons, each of those platoons having four MMGs. So, each machine-gun company would have three LMGs and four MMGs acting in support, on paper at least – as a general rule, Soviet units were often well understrength compared to the book stipulations. Yet extra firepower could be sourced and applied where it was needed; what this report does suggest is that the volume of automatic firepower was boosted for the attack. Not that it ultimately bought victory – the effort was repulsed in about 30 minutes with the cost to the Soviets of some 900 casualties.

Facing Soviet machine guns used in the defence

The US Army-collated combat reports also include an example of Soviet machine guns integrated into a defensive plan. It focuses on a Red Army action in August 1941, on a crossroad in wooden terrain near the city of Kanev in central Ukraine on the Dnieper River. The German Infanterie-Regiment 169 was given the job of taking the position:



On the icy Leningrad Front, Soviet troops drag a Maxim machine gun into firing position using a small boat tied to three soldiers, the Sokolov mount's wheels being useless in the snowy landscape. The greatest deficiency of the Maxim machine guns in World War II lay in their excessive weight. (Sovfoto/Universal Images Group via Getty Images)

In organizing their defense the Russians set up two lines of combat outposts, the first line occupying two adjacent ridges about 1,000 yards in front of the MLR [main line of resistance] at the southern edge of a woods, the second on a ridge about 500 yards behind the first. Each outpost line was manned by one rifle platoon, with one sniper and two machineguns per squad. Between the two lines of outposts the Russians sited two light mortar squads. Infantry cannon and heavy mortars supported the outposts from behind the MLR, the forward observers for these pieces being stationed on the ridges.

The Russian main battle position was organized with two rifle companies, each having one platoon at the edge and two platoons echeloned in depth within the forest. The crossroad proper was defended by the remaining elements of the company assigned to the outpost positions. The positions along the edge of the forest consisted of groups of two to six foxholes, each well camouflaged. A number of snipers were posted in trees at the edge of and within the forest. The positions in the forest were dug in almost straight lines and were so well concealed that they could be spotted only at very close range. At several points the Russian machine gunners and snipers had cleared narrow fire lanes, but none of these was higher than twenty inches [50cm] from the ground, so that approaching Germans would be unable to recognize them. The defenders did not have sufficient time to set up live [living vegetation] or dead [harvested wood and other materials] abatis. They laid wooden antipersonnel mines in three fields across the road leading to Kanev from the west. Some of the riflemen were dug in under wood piles, each entrance being concealed from the outside. (Department of the Army 1953: 241–42)

Although the specific machine-gun types are not provided here, it is likely that in the lighter first line of defence they were DPs, while those in the main line of defence would be M1910/30s. Note how the description of the defensive layout echoes some of the points made above about having alternate fighting positions for the MMGs, and about avoiding placing weapons on the edges of treelines. The machine-gunners also made sure to clear vegetation from in front of their guns, not just to improve visibility of the fields of fire, but also to improve accuracy – the impact of a bullet clipping a twig is often sufficient to make the bullet deviate from its intended point of impact.

As described, the first stage of the battle went well for the German attackers:



Taken after the end of World War II, this photograph shows Red Army soldiers struggling along with a wheel-mounted SG-43, the soldier at the top pulling the machine gun by its rear leg. By 1945, it was common for the heavy shield to have been removed to save weight. (Nikolay Bobrov/FotoSoyuz/Getty Images)

At 0900 on 14 August the 1st Battalion of the 169th Infantry Regiment approached the forest from the south. Although the battalion commander did expect Russian resistance within the forest, he was unaware of the strength of the defensive positions. The German advance guard had come to within 1,000 yards of the first ridge when the Russians suddenly opened up with machinegun, mortar, and small arms fire. The battalion commander thereupon deployed his unit for a concerted attack on the first ridge and called for artillery support. The German fire, zeroed in on the first ridge, was too much for the Russian defenders, and, after a short period of hand-to-hand fighting, the German infantry captured the first outpost line. When the two light mortar squads located between the two outpost lines tried to withdraw, German machine gunners and riflemen took them under fire and wiped them out. (Department of the Army 1953: 242)

Through fire and manoeuvre, and enjoying the benefits of artillery fire support, the German infantry managed to overcome the first defensive line with little trouble. The second line, embedded more deeply in the forest, proved to be far more difficult to clear, and the report notes that ‘At 1030 the second outpost line was still holding fast; Russian machine gunners and snipers pinned down the Germans on the opposite ridge’ (*ibid.*). Only an

interjection by Junkers Ju 87 Stuka dive-bombers, which destroyed many of the Soviet support weapons, finally loosened the Red Army's grip on the woodland, and the Germans cleared out the final resistance. It was respectfully noted: 'The speed with which the Russians had established their excellent positions at the edge and inside the forest amazed the Germans. In the course of just one night they had dug themselves in and camouflaged their positions and weapons with great effectiveness' (*ibid.*).

CONCLUSION

From 1945 the development of military firearms entered an era of transformation. At the heart of this change was the rise of the intermediate-calibre assault rifle, first demonstrated in wartime weapons such as the German 7.92×33mm *Kurz* (Short) Sturmgewehr 44, but after 1945 most fully embodied in Kalashnikov's ground-breaking AK-47. In the world of machine guns, evolution was also taking hold. Germany had fully demonstrated the principle and value of the fast-firing, air-cooled GPMG, and the rest of the world began to play catch-up, many countries looking to rationalize their traditional LMG, MMG and HMG categories into fewer weapons.



The RP-46 was essentially a belt-fed version of the RPD. It had a particularly heavy barrel, which could absorb the heat of up to 500 rounds of continuous fire without the need for a barrel change or external cooling. (© Royal Armouries PR.7234)

The Soviet Union entered the Cold War era with a set of machine guns that had proven themselves in the greatest conflict in human history; but change was coming, and it had to be embraced. An illustrative example is that of the RP-46 and RPD, the last machine-gun designs from the great Degtyaryov. In 1946 Degtyaryov introduced the RP-46, which could be seen as his attempt at developing a more modern MMG. Intended as a 'company-level' gun, the RP-46 was essentially a variant of the DP, but with a heavier barrel, a belt-feed mechanism, an improved barrel-change system and a carrying handle. It fired the standard 7.62×54mmR rifle round at 650rd/min. Although the RP-46

was adopted into Soviet service and remained in use for the next 15 years (with wider global sales), it was rather overshadowed by other designs.

The RPD showed Degtyaryov responding to the new developments in calibre. It was a gas-operated, bipod-mounted LMG chambered for the AK-47's 7.62×39mm round, feeding from a 100-round belt stored in a drum container that sat beneath the receiver. While indebted in several respects to the DP and DPM design, the RPD made some decisive breaks, such as having a fixed barrel (barrel heat was controlled by responsible firing and nothing more). The RPD was, like the RP-46, adopted for service and would remain in use with Soviet forces until 1961 (much longer in other communist-aligned states). Its chief problem, never entirely overcome through improved variants, was that the intermediate cartridge struggled to deliver the power to lift the dangling, unguided 100-round belt vertically. In the early 1960s, therefore, the RPD was replaced by Kalashnikov's RPK, which was basically an AK-47 assault rifle but with a heavier barrel and a bipod – again Soviet simplicity had triumphed – and also the PK GPMG (see below). Even so, DPs and DPMs were distributed heavily throughout Eastern Europe, Africa and Asia and have served in dozens of conflicts from the Korean War and Vietnam War through to recent fighting in Afghanistan, Iraq and Ukraine.

Turning to MMGs, in many ways the Soviet Maxim was obsolete when World War II ended, but it worked so well that it soldiered on for some time yet, giving communist forces service in the Korean War and Vietnam War. Yet in Soviet service the M1910/30 was superseded by the SG-43 MMG, which in its post-war modernized form, the SGM, remained in service until the late 1960s and far longer elsewhere. In 1961, however, the PK (*Pulemyot Kalashnikova*; 'Kalashnikov's machine gun') was introduced, and became the Red Army's first genuine GPMG. It sported a combination of the AK-47's rotating-bolt gas mechanism, the SG-43 feed system, the trigger from the DP plus some other influences, all working with the traditional 7.62×54mmR cartridge but belt-fed and featuring a quick-change barrel. The PK spawned variants for use on tripods, as armoured-vehicle coaxial and turret weapons, a lighter and improved infantry assault type (the PKM) and others. The PK family is still a core weapon system of the Russian Army and has had more than 50 international users; including licensed manufacture, more than 1 million examples of this weapon type have been produced.

At the heavy end of the scale, the DShK and particularly the DShKM are the most enduring of the original World War II Soviet machine guns. Like the

US .50-calibre Browning M2 HB, the DShKM has been at the forefront for more than 60 years of warfare – in fact it would probably be quicker to list those conflicts in which the DShK/M has *not* been involved than those in which it has. The fundamental proposition of the ‘Dushka’ – a solid, extremely reliable weapon that can engage targets with awesome destructive force beyond 2,000m – is still absolutely relevant to modern warfare; but this is not to say that it hasn’t had its competitors and more modern options. The 12.7×108mm NSV was adopted in 1971 by Soviet and Communist bloc forces, originally intended as a replacement for the DShKM, offering a faster rate of fire (700–800rd/min) and similarly provided in mount variants for ground, armoured and anti-aircraft use. The NSV is still in significant use around the world today, although in Russian service it was replaced in the late 1990s by the 12.7×108mm Kord, a gas-operated rotating-bolt weapon with such well-controlled recoil that it can even be fired from a bipod.

So the post-war story of the Soviet machine guns of World War II is a classic one of continuity and change; and given the broad distribution and the durability of the designs, the continuity part of the story is likely to run for a lot longer yet.

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The PK was the Soviet Union's first successful incarnation of the general-purpose machine-gun concept, but it took until 1961 for such a weapon to be introduced. This is a PKM variant in Finnish service. The PK family's use of the old 7.62×54mmR cartridge, however, kept one foot in the past. (MKFI/Wikimedia/ Public Domain)

ABOUT THE AUTHOR

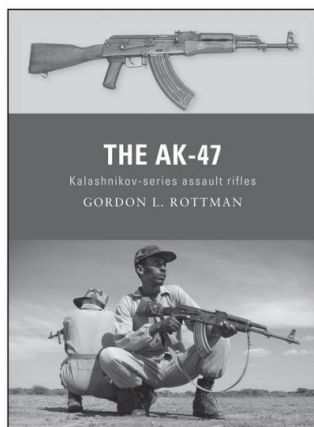
Chris McNab is an author and editor specializing in military history and military technology. To date he has published more than 100 books, many for Osprey, including *Hitler's Tanks* (2020) and *The Great Bear at War* (2019). Chris has also written extensively for major encyclopaedia series, magazines and newspapers.

ILLUSTRATORS

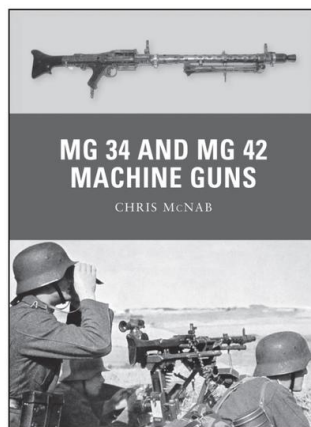
Steve Noon was born in Kent, UK, and attended art college in Cornwall. He's had a life-long passion for illustration, and since 1985 has worked as a professional artist, illustrating over 70 books for Osprey. Steve completed the battlescene illustrations in this book.

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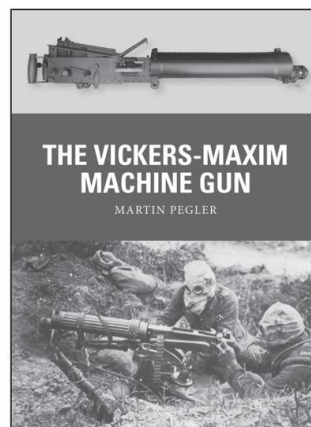
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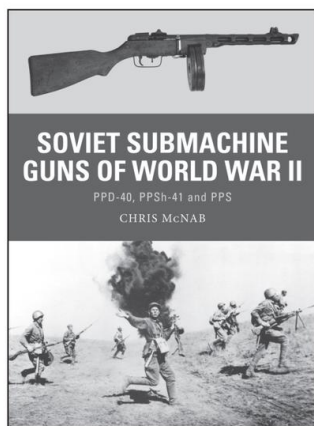
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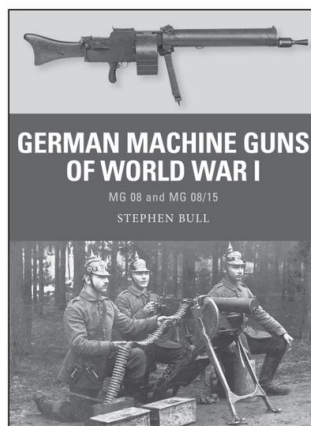
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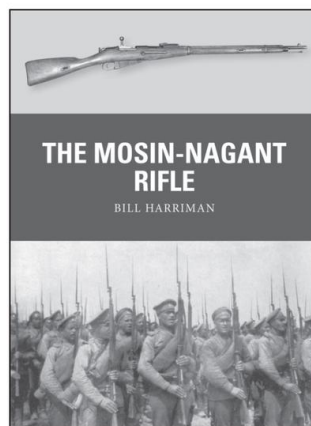
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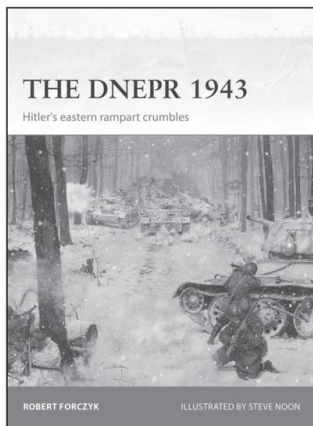


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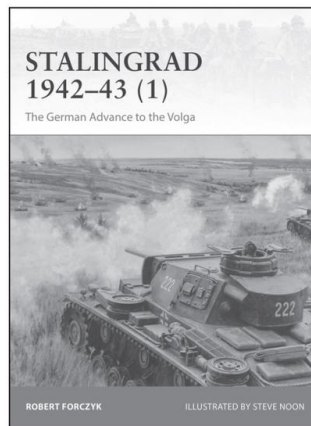


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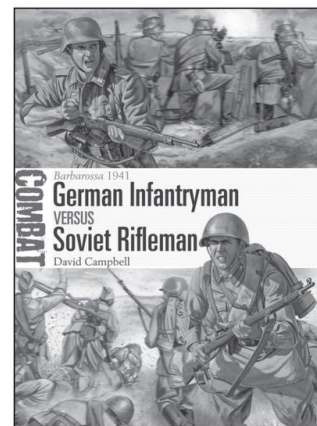
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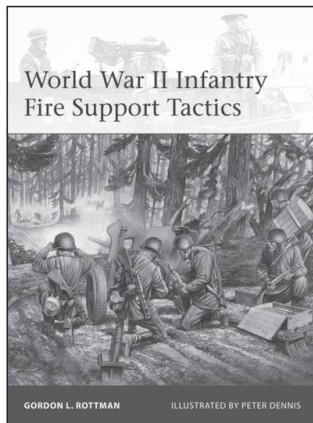
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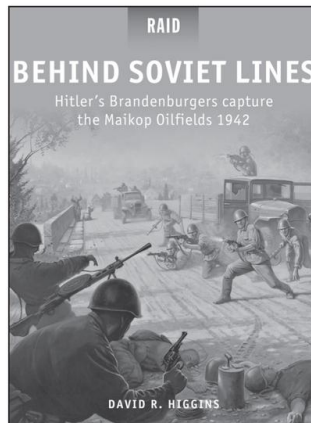
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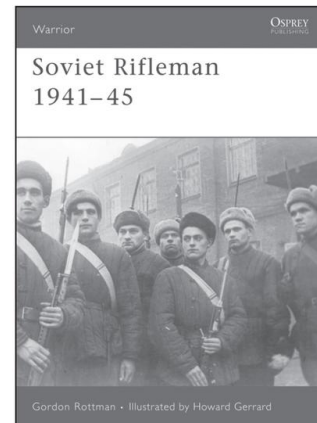
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Artist's note

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Front cover, above: The DP-27 light machine gun had a simple and reliable gas-operated mechanism, but included several more distinctive features, including the 47-round pan magazine (actually one of its weakest features), a grip safety mechanism and a bulbous stock designed to assist grip during automatic fire. (© Royal Armouries PR.7077)

Front cover, below: A PM M1910/30 gunner lays down fire from a doorway in Stalingrad in the autumn of 1942, with the assistant gunner supporting him with rifle fire. The Maxim machine guns were not well-suited to urban combat, being heavy and slow to manoeuvre and requiring space to emplace effectively – not easy to find in the ruins. (Sovfoto/Universal Images Group via Getty Images)

Title-page photograph: A machine-gunner lays down fire from his M1910/30, from the classic Sokolov mount. Despite the introduction of the Vladimirov 'Universal' mount in 1931, these were never manufactured in sufficient quantities and the Sokolov stayed in production and service

throughout the war. (From the fonds of the RGAKFD in Krasnogorsk via Stavka)